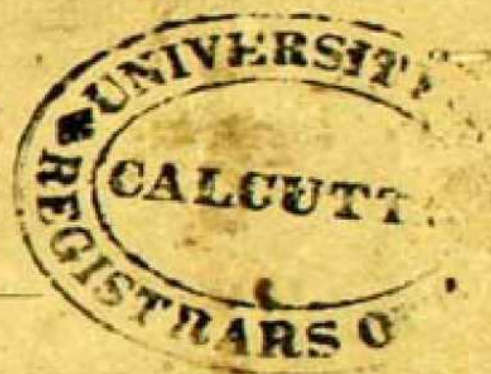




JOURNAL
OF THE
ASIATIC SOCIETY
BENGAL.



EDITED BY
THE SECRETARY AND SUB-SECRETARY

VOL. XII.

PART II.—JULY TO DECEMBER, 1843.

NEW SERIES.

"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of *Asia* will commit their observations to writing, and send them to the Asiatic Society, in Calcutta; it will languish, if such communications shall be long intermitted; and will die away if they shall entirely cease."—SIR WM. JONES.

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JOURNAL

OF THE

ASIATIC SOCIETY.

Report of a Visit to the Pakchan River, and of some Tin localities in the southern portion of the Tenasserim Provinces. By Captain G. B. TREMENHEERE, F. G. S. Executive Engineer, Tenasserim Provinces. With a Map and Section of the Peninsula.

1. The boundary between our provinces and the Siamese territory at the south and western extremity of Tenasserim, has never been distinctly defined.

After a correspondence with the Court of Bangkok, it had been arranged that an agent on their part should meet Mr. Commissioner Blundell on the Pakchan river on the 1st of March, where evidence was to be heard on both sides, and the question finally settled. The departure of the Commissioner from Maulmain was unavoidably delayed till the 4th of March. At Mr. Blundell's request, I formed one of his party in the H. C. Steamer *Hoogly*, and touching at Amherst and Mergui, entered the Pakchan river on the 10th of March.

2. The entrance is about two miles wide, affording ample room and deep water for the admission of ships of the largest burthen. The numerous islands which range along either shore of this fine river, and the bold hilly country beyond, afford views which would be thought picturesque in any country. For the first ten miles it is very slightly contracted in breadth, and has little of the character of a river, but of a capacious inlet of the sea. To this distance we carried not less than four fathom water, but, for the most part six and seven. After proceeding thus far, we turned into the Malewan river, and anchored at about



one and half mile in a N. W. direction, for the purpose of communicating with the British Settlement of that name. The next day, proceeding eight miles higher up the main river, we anchored in three fathoms abreast the confluence of the great Kaman river, beyond which the channel being much contracted by sand banks, the Steamer could not proceed. From thence we moved in boats, and arrived at Pakchan in eight hours; the distance as surveyed by Captain R. Ross, commanding the *Hoogly*, being thirty miles. The river narrows gradually, and from the great Kaman, passes through level country, approaching Pakchan, hills again appear, and it becomes very tortuous, at which spot it is about 50 yards broad, with a rise and fall of tide of eight feet at the springs.

3. The governor of Pakchan, a Chinaman, informed Mr. Blundell, that the chief of Peechapooree, who had been deputed by the Siam government to meet him, had arrived at Pakchan punctually on the 1st of March; after waiting ten days, he had retired to Chimpohun, on the plain of the east side of the peninsula. It was therefore determined that Dr. Richardson, Assistant to the Commissioner, should go to the chief and invite his return to the projected conference: accordingly, Dr. Richardson and myself, with a few of our own followers, commenced our journey on foot a little after 5 A. M., the prospect of crossing the peninsula being an object of peculiar interest.

Following generally the course of a small stream called the Kraa, which joins the main river at Pakchan, we proceeded by a good and clear road of ten to fifteen feet wide through the jungle towards the Kraa Pass, distant three miles in a N. E. direction. The road here turns to the South of East and the Pass, which is not intricate, leads for some distance along the bed of the rivulet, and terminates to the South-East at six and five-sixth miles from Pakchan. Here the greatest altitude is attained between the valley of the Pakchan and the alluvial plains on the east side of the peninsula, for soon after, at eight hours and seven minutes A. M., we came upon the waters of the Chimpohun, running in an easterly direction towards the gulf of Siam, the country then begins to slope gradually to the East; at eight hours thirty-seven minutes A. M., we halted two hours for refreshment by the side of the Chimpohun, at a spot where there are three or four houses, having the name of Bantapakchan. We here observed a canoe, which can be floated to



Chimpohun during the rains, and if necessary, to the gulf itself. From thence the road continues good. It crosses the Chimpohun very frequently, besides many dry ravines which communicate with it; the banks of these, where crossed by the road have not more than thirty or thirty-five feet of abrupt declivity, the rest of the ground being very regular, and partaking of the general slope of the country. At 3 P. M., having walked seventeen and half miles, we fell in with an elephant, and inducing the driver to take us on, were relieved from further personal exertion. The first eight miles of the eastern slope of the Pass have the greatest fall, after which the descent is easy till we reach the alluvial plain of Chimpohun. Nearing this plain, at 5 P. M., we observed the influence of the tide in the river, and at 5-30 reached Chimpohun. The plain is covered with rice fields, bearing signs of abundant crops as far as could be observed on all sides, and is bounded by a range of hills bending in a curved direction to the South-East. Some of these near the plain have much the same isolated and abrupt character, as the limestone hills near Maulmain. After half an hour's delay, the headman forwarded us on fresh elephants to the camp of the chief, which we found at Tasapaow, three and half miles distant further East, and reached it at 8 P. M., the entire distance between Pakchan and Tasapaow, being nearly twenty-eight miles.

4. We were here hospitably treated, and visited the chief early the following morning. After a slight dinner, Dr. Richardson succeeded in inducing him to return and confer with Mr. Blundell, whom he expressed himself anxious to meet. His encampment was on the right bank of the Chimpohun, where the river is about 180 yards broad, running through a level country over a sandy bed, free from obstructions, and with a rise and fall of tide of about six feet at the springs. The depth of water at 8 A. M. on the 13th of March, was six feet with a rising tide. It communicates directly with the gulf of Siam, from which, by the best information, we were distant five miles. A sea-going boat of about thirty tons was under a shed at this spot; but junks trading on the Siam coast do not pass beyond Tayang, a town four miles East of Tasapaow, and within a mile of the sea. Time would not admit of our going to the coast, as Mr. Blundell and the rest of the party were expecting our speedy return to Pakchan. The distance of Tasapaow from the sea, as above given, may I think



be relied on, having been obtained from one of our own people who had formerly resided some time at Chimpohun. The protraction of my route also, with these five miles added, makes the East coast of the peninsula correspond, within one mile short, with its longitude by Horsburgh's chart. The distance therefore between Pakchan and the coast of the gulf of Siam is thirty-two miles, and the entire breadth of the peninsula at this point from the Bay of Bengal to the gulf, is as nearly as possible sixty miles.

5. After receiving the chief's return visit, elephants were provided to take us back to Pakchan; we started at 11 A. M. and halted for the night on the Chimpohun river at a shed about half way, named Tacumlae, and reached Pakchan the next day, 14th March, at 2 P. M. On the way back, I paid particular attention to the inclination of the country, with the view of forming a probable estimate of the elevation of the top of the Kraa Pass, where the head waters of the Kraa and Chimpohun rise, and I am of opinion, that the difference of level between that point and the plains at Chimpohun and Pakchan does not exceed 450 feet. Along the entire route between these two places, or twenty-three miles, running water was crossed thirty-two times, besides which, there are numerous dry nullahs before mentioned, which would be occasionally unfordable during the rains.

The road is never more than 100 feet above the bed of the river-course; it has an easy slope, and except at the crossings of the streams and nullahs, is now passable by guns; but no part of the road would during the dry season present any difficulty to the passage of an army.

6. Some speculations having appeared lately in the columns of the *Moulmain Chronicle*, on the practicability of carrying a canal across the Isthmus of Kraa, whereby ships might pass by a short route from India to China, instead of round the Malayan peninsula, I am induced to offer some observations, under the idea, that enquiries on the subject might probably be made at some future period.

From the tidal waters of the Pakchan flowing westward to the Bay of Bengal, to those of the Chimpohun running eastward to the Gulf of Siam, I paid as much attention to the slopes and facilities for such a work as the nature of our journey allowed, and while no work of this description, where the physical difficulties are not absolutely insurmountable, ought perhaps to be pronounced impracticable, I have no



hesitation in saying, that the scheme alluded to, is not in my opinion reasonably practicable.

On a rough estimate, I assume 450 feet as the greatest rise of ground between the two seas, and if we suppose the line of road to be 100 feet above the level of the bed of the water-courses of the Pass as they now exist, and deduct that from the above, it will leave 350 feet of excavation, chiefly in solid rock, to be effected at the head of the Pass, to which the depth of the ship channel would remain to be added.

As no ship could come higher up than the second anchorage of the Hoogly, or 25 miles in a direct line below Pakchan, the length of the canal would be increased by that distance, as well, in all probability, by the five miles beyond Tasapaow, as the rivers on that side of the Peninsula are known to be generally obstructed by bars of sand. Both the Kraa and Chimpohun rivers are very small streams at this season, running over rocky beds, and no supply of fresh water could, I think, be depended on from either, to feed such a canal, or that would be sufficient at any period of the year to supply the loss by absorption and evaporation. An approximate section of the ground is given on the accompanying plan, by which it will appear, that the probable cutting for such a canal, supposing its width 100 feet and of rectangular form, would be on the lowest calculation as follows:—

| | Length. | Breadth. | Depth. | Cubic Feet. |
|---|----------------|------------|----------------------|---|
| From the Great Kawan River to Pakchan, | 25 miles | + 100 feet | + 60 feet | 870,000,000 |
| From Pakchan to top of Kraa Pass, | $6\frac{5}{6}$ | Do. + 100 | Do. + $380 \div 2 =$ | 685,520,000 |
| From top of Pass to a spring marked in the Map, ... | 16 | Do. + 100 | Do. + $380 \div 2 =$ | 1,605,120,000 |
| From the spring to Tasapaow, | 5 | Do. + 100 | Do. + 180 = | 264,000,000 |
| From Tasapaow to the Gulf, | 5 | Do. + 100 | Do. + 50 = | 132,000,000 |
| | | | | <hr/> 3,556,640,000 { Solid feet of Excavation, |

which, supposing that one man excavated during the entire work twenty cubic feet per day, and placed it where it was eventually to remain, and that one man's labor is there worth one rupee per day, would cost eighteen millions sterling.

7. Having remained at Pakchan during the 15th, for the purpose of the conference between the Siam Chief and Mr. Blundell, which took place on the morning of that day, we left the place the same evening, and rejoined the steamer again in eight hours. On the 16th, we



dropped down to our first anchorage, and on the same day visited the settlement of Malewan, which is on a branch of the Malewan about seven miles from its junction with the Pakchan. On the flood tide, junks of twenty or thirty tons can approach it; but at low tide there is no water to float the smallest canoe.

Malewan is but a recent settlement, and is particularly interesting, as being the only spot in these Provinces, where people have located themselves for the purpose of collecting tin. Although inhabited only for three years, there are already about 100 Chinese, 160 Malays, and about as many Siamese on the spot, more than 500 in all, including women and children. The surface of the country is pleasingly undulated, having a range of high hills between it and the sea. It possesses a rich moist soil, highly favourable to cultivation. The sugar cane shewn to us was of large size, and the areca tree, which in other parts of Tenasserim does not fruit till the 7th or 8th year, was seen here in flower after being three years in the ground. Two heavy falls of rain occurred while we were in this neighbourhood, and it would appear that its climate, more resembling that of Penang than any other part of our coast, would be well adapted, with the advantages of soil before mentioned, to the cultivation of nutmegs, spices, &c.

8. The Siamese and Malays are occupied principally in clearing for cultivation, and the Chinese are the chief adventurers in tin. The head Chinaman has established a store of provisions, consisting of every description of supply suited to the wants of the people about him, which he exchanges for tin ore, to those who may be industrious enough to collect it. Of this he had three or four tons on hand, from which sample A was taken. It is precisely similar to specimens I have forwarded on other occasions, and consists of pure peroxide of tin, collected by washing from the beds of streams in that neighbourhood.

On the 17th, I proceeded to a spot which one of the Chinamen had fixed on for a stream work, and reached it after walking between four and five miles.

The stream is one of the tributaries of the Malewan, marked No. 1 in the plan. Their principal work was not on the main stream, the course of which we had followed to reach the place, but on a small branch, which then afforded water scarcely sufficient to clean and exhibit a sample of the ore dug out with its sand and gravels before me.

This tin soil consisted of fine grey sand, mixed with quartz and granite pebbles, and was taken from near the surface of the bed of the water-course; it was not here more than eighteen inches deep, for as soon as the iron pick, with which it was loosened, penetrated to the clay, they seemed assured there was no tin below. The subsoil all around is said to contain tin, the deposit of former periods; and in some of their excavations, I observed soil precisely similar to that from which tin was washed on the lower levels. From its occurrence so near the surface in existing water-courses, which from their slope must become rapids during the rains, I infer that tin must be washed down from its source in considerable quantities every year.

The trough used for washing is circular, about eighteen inches in diameter and six inches deep, in which the sand and gravel is piled and washed, as before described, by a rotatory motion of the hand. Specimens of the soil, and of the produce of separate washings are sent, numbered 1. During the dry season, little or nothing is done in collecting tin, but preparations only are made by trenching for considerable distances along the brow, or down the slopes of the adjacent hill, to obtain a fall of water during the rains. Under this the soil is collected, when the sand and pebbles are washed away, leaving the tin behind. Some of these trenches were from ten to twelve feet deep, and one of about three feet deep was nearly 200 yards in length. The fall so obtained saves the laborious process of washing with the trough in a stooping position, which is irksome to the men, but which women and children are said to perform with greater ease.

9. The next day I went again in a Northerly direction five miles, to visit three other localities, where other parties of Chinamen were engaged in similar works. At each of these places, there were from eight to twelve men employed in preparations for work during the ensuing rains. The surface soil is a rich red mould, the subsoil of the same grey sand and quartz pebbles as before, with abundance of tin intermixed, and rests upon granite.

The three spots visited this day have all the same character; from the first the separate washings were less productive than from the other two; but at these the quantity produced each time surprised me, and drew forth an exclamation of pleasure from the Chinamen engaged in collecting it for my inspection. The greatest quantity of clean ore

obtained from one trough full of soil was 2078 grs., while the average was 1235 and 855 grs. The time occupied in each washing is from five to six minutes.

They stated, that in the rains, one man would earn four rupees worth of tin per day. These small parties appeared full of energy and determination to make the most of the advantages before them. About their houses, situated in small clearances in the midst of the jungle, there was an appearance of comfort and cleanliness not often seen on this coast, while their good nature and hospitality is unbounded.

10. The prevailing rock around them is granite, which is seen in situ in several places, cropping out of the soil from the beds of the stream, and in the cuttings before mentioned, where I observed it was a good deal decomposed. I do not find on examination, that in any instance the tin exists interspersed in the granite, but have every reason to confirm the opinion expressed in former reports, of its occurrence in the fissures and cavities of the rock from which it has been removed by disintegration of the enclosing substance. None of the Chinamen have, as far as I could ascertain, penetrated to the principal granite hills, but are content with what they find in the streams at a distance from the source whence the tin proceeds. There doubtless it exists in veins or *vugs*, or cavities, in abundance. The metal being found so near the surface of the present water-courses, the causes which have distributed a rich layer of tin soil in and around them, are assuredly still in action. Fresh veins or cavities loaded with the crystalized mineral are thus becoming constantly exposed to the decomposing effects of the weather, and are therefore to be found by mining at very moderate depths. The stream works described will form, perhaps for long periods, profitable employment to Chinese adventurers, whose system of collection is that to which the Siamese and Malays are accustomed. These productive streams are, however, but the index of what is to be found elsewhere, and if these localities ever attract the European capitalist, of whose notice I believe them to be well worthy, the proper sphere for the scientific miner should be in the hills themselves. There, if a little cautious investigation were previously made by practised men in search of a spot for mining operations, the use of the common horse whim, or the most ordinary draining apparatus, would, in my opinion, in the course of a very short time discover veins, which



it would be very profitable to follow out with more complete and expensive apparatus.

11. After my return from the tin works we left Malewan, and proceeding next day down the river, anchored at the mouth of the Rhenong river, for the purpose of visiting the Siamese tin works and smelting establishment on the Southern or Siamese side of the Pakchan. This tidal creek is nearly dry at low water, but small junks come up with the flood: it narrows considerably at three miles from its entrance, and is very circuitous; after three hours' pull in a boat in a S. E. direction, we reached the settlement of Rhenong.

• The leading people here are Chinese, who have a high fenced enclosure about eighty yards square, one side of which is occupied by the smelting establishment. A few women were employed in sifting tin ore* through a fine sieve. Only one furnace, or large crucible about four feet high, of conical form and three feet diameter at top, formed of baked clay, appeared to be in use, this was well worn, and a new one was there ready to replace it. One pounding, or stamping machine, with a tilting bar worked by the foot, the Chinese bellows, and heaps of charcoal, were all the apparatus visible. No tin is collected except during the rains, and the village did not contain more than fifty families in all.

The duty said to be paid to Siam by the Chinaman is six tons of smelted tin per annum, for which he enjoys an entire monopoly. The collectors of the ore are paid a nominal price of two dollars for eighteen viss of ore; but as the payment is made by small ingots of tin, the only currency in use, the actual value received by workmen according to the present selling price of the metal, is eight rupees per hundred viss of ore: the same quantity being at Mergui worth forty rupees. It appeared from the information we were able to collect of the reported arrivals of junks at Rhenong for cargoes of tin, that not more than from sixty to seventy tons are produced per annum. The spot itself having a bold range of granite hills near, with level rice ground between it and the stream, has a very pleasing appearance. A few women were engaged in collecting tin ore in a clear stream running over granite boulders, within a few minutes walk of the place, and the

* Specimen B.



produce of several separate washings from the trough was taken and noted, the result of which, compared to those of Malewan, &c. will be found below.* Their principal stream works are a day's journey distant towards the hills, which we could not visit.

12. With the falling tide we rejoined the steamer, and soon after stood between the islands to the Northward towards Bokpyen, one of our own settlements, and visited some of the islands on our way. The most remarkable of these are the bird's nest rocks, of which we inspected two, the Turrets and the Elephants; they consist of fine picturesque masses of limestone rock, which stand boldly up, and present a perpendicular wall to the sea, with deep water all round them. The edible nests of the small Martin, so much prized in China, as to sell sometimes for more than their weight in silver, are found on the sides of chimney-like cavities, which extend from the summit of the rock more than 200 feet above the sea, having a small cavernous opening, with room enough only to admit a boat at low water.

13. Bokpyen, which is marked in Captain Lloyd's Chart, though not included in the sketch herewith, is a neat and flourishing village, containing about 98 houses, or 400 inhabitants in all. They are chiefly of Malay extraction, and occupied in the cultivation of rice, the collection of rattans, fishing, &c. The Bokpyen river produces tin, and during the Siamese rule, large tin works are said to have existed. A channel for running water, the remains of which are now traceable, is reported to have extended over a considerable distance by aqueducts and cuttings, which is presumptive evidence of the abundance of tin in the neighbouring hills. Little or none is collected now; one man brought us a very good sample in a bamboo; from this he said he had sifted the fine grained tin, which he had either sold or smelted, and, not knowing what to do with the large pieces, had kept them.† These were lumps of pure peroxide of tin, measuring from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch, without any quartz or earthy matter adhering, and this he called "refuse tin," which was of no use to him: a fair example of the ignorance with which tin working is conducted in these localities.

14. The following is a comparative statement of the produce of separate washings from a trough full of tin soil, each washing occupying

* Specimen No. 5.

† Specimen C.



1843.]

Visit to the Pakchan River.

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five minutes in filling from the bed of the stream and cleaning, as exhibited by the specimens sent and numbered:—

| <i>Locality Malewan, No. 1.</i> | <i>Weight of separate washings in Grains Troy.</i> | <i>Average of each in Grains Troy.</i> | <i>Average of the whole in Grains Troy.</i> |
|-------------------------------------|--|--|---|
| | 326 | | |
| | 404 | | |
| | • 320 | • | |
| | • 327 | • | |
| | 177 | | |
| | 157 | | |
| | 163 | | |
| | 143 | 252 | |
| Malewan, No. 2, | • 297 | | |
| | 93 | | |
| | • 448 | | |
| | 120 | | |
| | 177 | | |
| | 472 | | |
| | 180 | 555 | |
| Malewan, No. 3, | 534 | | |
| | • 1499 | | |
| | • 1100 | | |
| | 2078 | | |
| | 1024 | | |
| | 1173 | 1235 | |
| Malewan, No. 4, | 1076 | | |
| | 503 | | |
| | • 1142 | | |
| | • 698 | 855 | 650 |
| Rehnong, No. 5, | 1081 | | |
| | 371 | • | |
| | • 991 | | |
| | • 653 | | |
| | 542 | | |
| | 555 | 699 | 699 |
| Bokpyen, No. 6, | 373 | | |
| | 253 | | |
| | 319 | | |
| | 227 | | |
| | 464 | | |
| | 1011 | | |
| | • 381 | 434 | 434 |



A good specimen collected at Bokpyen, by two men in about twenty minutes, weighed 2040 grains. The specimens marked by an asterisk are sent in duplicate with this report.

G. B. TREMENHEERE, *Captain,*
MAULMAIN, 8th April, 1843.

Executive Engineer,
Tenasserim Division.

Memoir on the application of Asphaltic Mastic, to Flooring, Roofing, and Hydraulic works in India. By Captain GOODWYN, Engineers. With a plate.

[This valuable memoir has already been lithographed, in which form many of our readers may have perhaps seen it; but its importance in all points of view is so great, that we have not hesitated to request permission from its talented author to insert it in the Journal.—Eds.]

At no period probably did there exist such an union of essential qualities in the means of constructing as at present. Allusion is here made to the value of the material employed, and the art of working and disposing it, so that in all classes of erections, whether private or public, there is an addition to personal comfort and convenience, combined with permanency of structure at an economical original outlay, estimated with reference to the least possible expence in subsequent maintenance.

The following memoir, in connection with others having relation to the improvements of the age, is drawn up with a view of introducing a most valuable material to general notice, one worthy the patronage of the Government, as well as the attention of the merchant, the planter, and all connected with building of every description. A material which has been extensively used with the most complete success on the continent for some years, and lately equally so in England. The excellent qualities and varieties in the mode of its application have received the approbation of the heads of our Engineer Corps now at home, Generals McLeod and Tickell, and Colonels Hutchinson and Colvin, in consequence of whose opinions I brought it to the notice of the Court, and was by the Directors permitted to bring some to Calcutta to be



submitted to experiment. This is sufficient authority for my advocating its adoption, and constitutes a guarantee for its future success in India. I will here slightly anticipate the subject by noticing the result of an experiment which I undertook, to prove the efficiency of the substance to resist great heat, lest any sceptic should stop short of a full investigation of its merits, under an idea, that its component parts being bitumen and pitch, it would not answer in India.

A section of prepared flooring in a wooden frame 12''+6'' with a surface of 3-8'' of mastic was placed in a large oven (used for reducing the asphalte to powder) with a thermometer which directly rose to 230°, and though kept in for six hours, it presented a surface at the end of that time quite free from grease, proving that the pitch, the proportion of which is small, was not drawn out by the great heat, the extent of which I could not ascertain, as the thermometer tube broke shortly after insertion. A very few minutes after being spread in a fluid state, it again resumes its original density, which is such, that at 100° Fahrenheit, it resists all impressions from ordinary force. How frail and perishable are the floors and terraces of ordinary construction? In many situations unable to resist the wear and tear to which they are exposed from a variety of causes, such as the friction of stores and other heavy articles in magazines and store rooms, the dragging to and fro of boxes, cots and musquets in Barracks, &c. &c., whilst public as well as private property suffers considerably from the facility of access to white ants and damp through the slightest crevices in floors. Who is not aware of the rapid increase of the smallest hole in a terrace floor, and of the difficulty of efficient repair from the want of combination between the new and old material? It must surely then be no small matter of consideration, the employment of a material which offers a remedy for these evils, and affords a means of putting a stop to the constantly recurring heavy outlay on repairs.

It is well known, that the use of a bituminous cement was common in ancient structures, and history informs us, that the walls of Babylon, that wonder of the world, were cemented with hot bitumen.* In the

* The Museum of the Society contains four bricks from Babylon, presented by Mr. Rich, and marked with the arrow-headed characters. On the reverse of these the bituminous cement is yet partially adhering, and upon examination, its chemical characters were found closely to correspond with those of Captain Goodwyn's Asphaltic Mastic.—EDS.

destruction of some remains of fortifications, supposed to be of Roman erection near Pyrimont about 45 years ago, so great was the tenacity of the work, that it was not pulled down without the aid of gunpowder, which circumstance led to an important discovery; it was observed that the cement resembled the asphaltic rock of Pyrimont, about five miles North of Seyssel at the foot of the Eastern side of mount Jura, on the right bank of the Rhone in the department de L'Ain. Several applications of the substance were immediately made, and the experiments on its properties as a cement for building masonry and keeping out damp succeeded entirely, since which, the working of the material has become of great importance. In the immediate vicinity of the asphalte is obtained a peculiar kind of mineral pitch, which mixed in certain proportions with the asphalte, forms the mastic, the subject of this memoir. Mr. Claridge, an English gentleman, has taken out a patent for it in England, and is most successfully bringing it into general use under the sanction of the Commissioners of woods and forests.

The surface of the ground in the locality of its discovery is covered by a molasse, consisting of silicious gravel and bitumen intercepted by deep ravines. A mass of calcareous asphalte is situated between two of the ravines, the external appearance of which is whitish, but internally it is of a deep brown color. The asphalte is equally diffused throughout the rock, in some places more or less saturated, but in others the calcareous matter is quite pure,* leading to the conclusion, that the asphalte is ramified in veins in the mass under the molasse. The calcareous asphalte is not stratified, fissures are seen intersecting each other in all directions. Various are the opinions of its formation, but the following is the most probable,—that it has been generated by heat naturally acting on the bituminous matter below strata of carbonate of lime; some of the bitumen has passed up and mixed with the lime, by nature adjusted in just such proportions as the lime would absorb, thus has been effected by a natural force, what by art could not have been, and it is this which renders this material so far superior to any manufactured article.

The resinous and sulphuric particles have passed up to the surface and formed a crust, so that the inflammable qualities, as well as the

* Bulletin de la Société Géologique de la France, Vol. VIII. p. 138.

naptha have been destroyed by volcanic agency, and the material is not liable to ignition. The calcareous asphalte contains from 15 to 18 per cent. of bitumen, the remainder is carbonate of lime. The bitumen from the results of experiments of a French chemist is found to be a compound of

| | | | |
|--------------------------------|-----|-----|----------|
| Resinous petroliferous matter, | ... | ... | 60 to 70 |
| Carbon, | ... | ... | 30 to 35 |

It is from the carbon that the dark color and property of hardening in the air arises which renders it so useful in the arts. The spaces below the carbonate of lime are fissures containing the mineral pitch, which is formed of the heavier particles of bituminous matter and carbon in another form, probably having experienced greater heat. As used in England and the continent, the asphalte is reduced to powder by baking, and being mixed with a proportion of about one-tenth its weight of the pitch and a fine grit, is reduced to a semifluid state, and poured on to the spaces or moulds prepared.

For exportation, however, the substances are formed by the Company in England into a mastic, and sent to distant parts in blocks of a cwt. each; by this means it is rendered useful to those who may not have had the advantage of witnessing the mode of application in England, as the mastic has merely to be heated, and laid down in the way which will be described hereafter. The mastic possesses nearly the hardness of stone, but preserves a certain elasticity which prevents the surface from wearing or chipping, and carriage wheels and horses' hoofs cannot disturb the evenness and regularity of its surface. Not the least of its valuable properties as a material for building purposes in India, is the facility of its removal from place to place; after having been laid down as a terrace in one building for years, it may be taken up, and requires merely to be reheated to be laid down elsewhere with equal utility. It is anti-electric, which makes it valuable for roofing purposes, and is not inflammable, the quantity of pitch being so small. The late fire at Hamburgh is proof of the non-inflammability of the material, for the roofs of many houses were terraced with it, and great alarm existed lest these roofs should burn and cause more devastation; they fell in solid masses unconsumed, and instead of serving as fuel, extinguished in their fall, the flames beneath them. It is wholly impervious to moisture, and can be extended indefinitely, and



and even where joints are necessary they can be so closed as to present a continuous surface; neither does it impart taste, smell or color, to any liquids that may come in contact with it when employed to line tanks, vats, reservoirs, &c. Having thus stated its origin, composition and essential qualities, I will proceed to the modes of its application.

The purposes to which it has been applied in France are so extensive and various, that they first claim attention. The Chevalier de Pambour states, that the pavements in several crowded thoroughfares of Paris have been made of this substance for the last six years,* and are now in excellent order. It has resisted the oscillation on suspension bridges and the varying temperatures of heat and frost, the asphalte being on such structures as perfect as the day it was laid down. For roofing edifices, lining water reservoirs, and paving stables it has been particularly useful, having been laid down seven years in the stables of Cavalry Barracks. It has been extensively applied in the fortifications of Lyons, as stated by M. Gahan, a Captain of Engineers, also at Lisle and Vinceunes, and the Artillery have covered the roofs of warehouses several years since in the arsenal at Douai, which have withstood all weathers. The naval department also have made numerous trials of it in the various buildings at the port of Toulon, and it is being introduced into the other ports of France. The pavement formed of it resists better than stone the friction of chains in Dock Yards; and in Jails and Hospitals it has been used not only on account of its durability, but that it keeps particularly clean, and ablutions are performed more easily on it. The material is also used on the "Pont Royal," and "Pont de Carrouse," on the areas round public fountains, in the court yards and extensive floors of colleges and churches.

It has been employed as a cement, and is more particularly valuable under this head for hydraulic works; several large tanks have been constructed in Paris with it. The mode adopted has been to cover the faces of the bricks that were to be exposed to the water with a very thin coat of asphalte; they were set in fluid mastic instead of cement, which was also poured into spaces, left for the purpose, of one-fourth between the inner and outer bricks forming the side walls as

* This was stated in 1840.

the work advanced. The bottom was afterwards covered with three-eighths of the mastic. Its use as a cement for hydraulic purposes is not new, for Buffon in his *Natural History*, article "Bitumen," says, "J'ai fait enduire il y a trente six ans un assez grand bassin du jardin d'histoire naturelle qui depuis a toujours tenu parfaitement l'eau." That Buffon did so write is stated in a pamphlet called "*Observations generales sur les mines bitumineuses du Parc de Pyrimont.*" In the "Place de la Concorde," in the centre of which the Egyptian obelisk is erected, about 24,000 square yards of most magnificent pavement are laid down of asphalte in elegant mosaic work, the fluid substance was spread in moulds of bar iron of the required pattern, which in this instance is alternate squares of black and white, each square having a circle of the opposite color to itself, in the centre. At the estate of the Baron de Montmorenci is a conservatory floored in the most splendid manner, the substance being formed into patterns of foliage and scrolls, with a rich Grecian fretwork border. In London it has been used in several places; the noble piece of pavement at Whitehall and the carriage drive to the Ordnance Office may be cited as examples. The roofs and terraces of several noblemen's houses are covered with it, and its efficiency universally acknowledged. In the manufacturing towns, the floors of large workshops and store-rooms are laid with asphalte, and the terraces of many sheds of railway stations. The whole of the arches of the Greenwich railway are covered with it, with a view of preserving that extensive viaduct free from damp. It is used as a foot pavement in many of the metropolitan parishes and in country towns also, and one of the principal streets of Liverpool is paved with it. To such a mass of evidence of the great utility and value of the material, as it has been applied in Europe, there is to be added the experiment of its efficacy as lately laid down in Calcutta, the Court of Directors having permitted the writer of this memoir to bring out a ton of the mastic for the purpose of testing its fitness for the public service. Petroleum oil is to be found in the neighbourhood of Rangoon, and on the Irawadee N. E. of Pegu and elsewhere, which substance, after the naptha is distilled from it,* will answer as a substitute for

* The price gained for the naptha might cover most of the expence of procuring the Petroleum. Limestone impregnated with bitumen, dried, ground and mixed with its own weight of coal tar is an admirable cement, and will form a most desirable terrace; its mode of using, the same as asphalte.

the mineral pitch and render the asphalte cheaper to use in India, as the pitch need not be exported. In case some such expedient should be resorted to, I will here annex the cost of the separate material, as well as of the mastic or compound as sold by the Proprietors in London.

| | | | | | |
|------------------------------------|-----|-----|-----|-------|----|
| 1 Ton of Asphalte powder | ... | ... | ... | £5 | 0 |
| Cask, &c. | ... | ... | ... | 1 | 4 |
| Mineral Pitch, (proportion 2 cwt.) | ... | ... | ... | 1 | 18 |
| | | | | <hr/> | |
| Total,... | | | | £8 | 2 |

The mastic is in blocks of 1 Cwt. each $18 \times 6 \times 4$ and £6 10s. per Ton; with the mastic however a little pitch is necessary to flux the first quantities when using, as will appear presently.

| | | |
|-----------------------|-----|---------|
| 1 Ton of Asphalte, or | .. | 20 Cwt. |
| Fine Grit, | ... | 8 do. |
| Pitch, | ... | 2 do. |

Total 30 Cwt. will cover a space of 400 feet $\frac{3}{8}$ thick for flooring. Exported in large quantities the cost of 100 superficial feet would be from 12 to 15 Rupees, exclusive of the substratum of concrete.

Instructions for use.

The mastic being ductile, great care must be taken to have a good foundation of concrete, or lime gravel, or broken bricks, with a thin coat of hydraulic mortar over all, the surface being made level: on this the mastic in a semifluid state is laid $\frac{3}{8}$ in thickness.

Mode of preparing the Mastic for use.

In the absence of a proper cauldron, such as is shewn in Fig A. a large pitch pot may be used over a strong fire; the blocks are broken up to the size of 5 or 6 ins. cube, and put into the cauldron with 1 per cent. of pitch to flux the lower layer; more mastic is put in by degrees when the first quantity is melted, which will flux the rest in succession, care being taken to stir it the whole time with the instrument shewn at B.

When the Cauldron is full or a sufficient quantity melted, and it has assumed the consistency of jam, it is fit for use. If the work is expected to have been fixed only with respect to existing *aurangs*: new ones

tensive, a number of cauldrons should be heated at once, as one of the indicated dimensions will not lay down more than 70 suppl. feet.*

In laying it down, a lath of the required thickness of the coating is placed across the floor or roof prepared as above, which from the wall or curb, as the case may be, should divide the whole space into compartments of about $2/6$ wide. It is necessary before laying down the mass to cut a small channel (if for a floor under the wall, if for a terrace close to the curb) of 2 ins. wide and 1 deep, into which hot mastic should be poured, and taken up again when settled in order to warm, and enable the whole to bind and adhere at the edges. Into the compartments above-mentioned the mastic is poured with a large ladle, the bowl of which should be a foot in diameter and 6 inches deep, each ladleful, as it is poured in, is rubbed from the centre towards the wall or curb with a wooden float (made of cask staves), and a smoothing rod of 3 feet long and 2 feet square is applied to level the surface by a man immediately in rear of the one who uses the float, who also whilst the substance is still hot sprinkles a powder on the surface through a very fine sieve, composed of the finest sand and unslaked lime, reduced into an impalpable powder in equal quantities, which is rubbed in with a flat board, and gives a white surface to the terrace which does not wear off. The surplus is carried forward with such a hand brush as the figure shews, at C as soon as the liquid material is smoothed. Care should be taken to force the substance well into edges and joints, and in removing the gauge rod not to lift it, as it may raise the asphalte with it; but by a gentle tap to loosen it horizontally from the mass. In laying down at two different times, when the first layer has had time to harden, the edge must be warmed with a little hot material laid on for a minute and removed, the work then to be proceeded with directly. If a roof is covered with wood, coarse canvas should be stretched over it and nailed, and the mastic laid on that, finishing it off with a fillet, as in D of the plate. Store rooms and magazine floors should be $3/4$ inch thick, stables $4/8$, and carriage drives 1, coverings of arches $3/8$.

* The cauldron must not be left standing, as the material will burn.

Contributions towards a History of the Development of the Mineral Resources of India. By S. G. TOLLEMACHE HEATLY, Esq.

No. 2. Memoranda relative to the working of Iron in Bengal.

The existence of iron in the districts of Balasore and Beerbhoom, seems to have been known at the earliest period of British rule in the country. With regard to Balasore, the following passage occurs in Captain Alexander Hamilton's Account of a Voyage to the East Indies in 1708, [vol. 1, p. 395]:—

In two days I travelled from Badruc to Balasore, and saw nothing in the way but things common and indifferent, the product of the country being corn, cloth, iron, anise and cummin seeds, oil and bees' wax. Iron is so plentiful, that they cast anchors for ships in moulds; but they are not so good as those made in Europe.

In Beerbhoom, iron manufacture seems to have been of not less antiquity. The ore which abounded in the district was dug out and collected by a set of men, who sold it to the *beparries* or itinerant dealers. A trifling contribution was levied on these miners by the Rajah within certain limits, and by some other landholders in their estates. The ore was carried by the *beparries* to established markets called *aurungs*, where it was purchased by the smelters, whose furnaces or *saals* adjoined the *aurung*. At these markets the Rajah had officers who levied a duty from the smelters in proportion to the quantity manufactured: part of the levy was made at the *kot-saal* or roasting furnace, and part at the *khamar-saal*, where the iron was finally prepared for use. The whole of the collections thus made was entered under the head of *loha mahal*, and was kept distinct in the Rajah's accounts from the rent of the land in which the *aurungs* lay. The Rajah again paid a certain assessment on his profits to Government, which assessment was also designated by the term *loha mahal*. The same item of Government accounts comprehended also the payments made by the few detached landholders to whom I have before alluded as imposing duties upon the miners in their estates. This detail will I think, in conjunction with the narrative that follows, shew clearly, that the right of ownership of the iron was

vested in the sovereign authority, the zemindars only claiming property in the ore by right of consideration paid into the treasury. Further, the right to the mineral products of the land was distinctly separated from the right of cultivation on the surface.

In 1774 a proposal was submitted by Indernarain Sermono to the Burdwan Council, and by them to the Presidency one. The correspondence is as follows :—

The Burdwan Council to Government.

• • We transmit you copy of a proposal, which has been delivered to us by Indernarain Sermono, for clearing away the jungle, and manufacturing iron in a mountainous part of the district of Beerbhoom, together with the sketch which accompanies it of the tract of country, for the lease of which he has applied. We beg leave to submit it to your consideration, and have only to observe, that by an inspection of the Mofussil accounts, none of the places mentioned within the boundary he has described, appear in the jumma of 1178, and that from the inquiries we have made, we believe that tract of country to be in the unfruitful condition described by him.—19th September, 1774.

Indernarain Surma's Proposals.

In the province of Beerbhoom, there is a considerable tract of mountainous country overrun with jungles, and which, in its present uncultivated state, serves no other purpose than that of a harbour of *Choars*, who live upon plundering the inhabitants of the cultivated lands. Within this space, there was formerly a village called Hatgatchya, situated about a coss south of a hill called Monsa Pahr (both in the Pergunna of Mallarpore). At first this village was much injured in 1174 and 1175 by the depredations of the *Choars*; and in the year of the famine, the whole of its inhabitants deserted the country around the village. On the north side three coss, on the west three coss, on the south three-quarter of a coss, and on the east two coss is an entire jungle, and yields no revenue. Accompanying is a sketch of it. This tract of country, in many parts of which iron ore is to be found, I request the lease of, on the following terms:—

The lease is to be granted to me for 7 or 10 years; for the first year, on account of the great expense which I shall incur by cutting the jungle

145127.

and erecting *saals* (or smelting places), I can pay nothing. For three following years I will pay 2000 Rs. per annum, and for the remaining years of the lease, I will pay 5000 Rs. per annum, which shall be in full of all rents or customs whatever.

I will engage, if business succeeds, to supply Government with what iron they may want at the bazar price of the time they may demand it.

I will not force any ryots from the *Malgoozary* lands, nor give protection to any who may desert with arrears of rent due to the farmers.

The *Choars* and mountaineers, who at present infest the *Malgoozary* lands, and by their violence cause the ryots to desert, will themselves engage in the working of iron. They gave me assurance of this, when I was lately in that country. I have travelled over the greater part of the country described in my sketch; I am confident no part of it is either included in the jumma of any of the present farmers, or yields any revenue to Government; but should I be mistaken, and it be hereafter discovered to contain any jumma lands, I will readily pay the highest rent that has been received from it since the beginning of 1178.

If the above terms are accepted and a grant given me—should Government, at the end of my lease, think proper to take it into their own hands—in consideration for the expense and trouble I shall have been at, I request a preference in farming it. In case they should not deem this advisable, I request to be allowed, for the expense of all the buildings I may have erected, whatever shall be determined to be their value by an Ameen sent by Government.

Government to the Burdwan Council.

We approve of the proposals offered you by Indernarain Surma, for clearing a part of the waste jungle lands of Beerbhoom, and manufacturing iron; and authorize you to grant him the necessary deeds accordingly, receiving from him such writings in return, as may bind him to the performance of his engagements with Government, and the observance of the conditions he himself proposes.—23d September, 1774.

Nothing more with reference to this attempt appears on record. Perhaps the speculation was of too sanguine a complexion, as the high rents offered lead us to apprehend, and was silently abandoned on second thoughts by the projector. One thing is, however, proved by it, and that is the *loha mahal* already accruing to Government seems

to have been fixed only with respect to existing *aurungs*; new ones might be founded and brought into operation by the enterprize of individuals on their payment of a consideration to Government. The farmers of the existing *aurungs*, among whom the Rajah of Beerbhoom was the principal one without comparison, do not seem to have been at all consulted as to the lease. They could not therefore have had any right to the mineral product beyond what was specifically granted by Government, for the amount of consideration received. I am anxious to draw attention to this fact, as this very pergunna of Mularpore became subsequently the scene of a hotly contested law-suit, involving the tenures of these *loha mahals*.

The next attempt was more fortunate. It was by Messrs. Motte and Farquhar. In all similar transactions of that period, one partner was, for obvious reasons, chosen from among the influential residents of Calcutta. His watchful presence at the focus of intrigue was required to defeat the machinations of interested parties, and enable the others, the working bees, to pursue their speculations in comparative quietness. To this *patron*, his *clients* could with ease afford a share of the proceeds at a time when the profits of trade were enormous, and he returned them, what was then indispensable—political protection. Thomas Motte, the patron of the firm in the present case, was the Superintendent of Police in the city, and an intimate friend of Warren Hastings. He had been employed in 1766 by Lord Clive, on a mission to Sumbhulpore, to open a trade in diamonds with that country; a previous attempt by Captain Mallock, under the direction of Henry Vansittart having failed. Motte's endeavours were equally unsuccessful,—a result which he attributed to the indolence of the inhabitants, and the iron rule of the Mahrattas, who at the period held the country as far as the Soobunreeka. An account, interesting in all its features, of this expedition drawn up by Motte, appears in the Asiatic Annual Register for 1799. He was an enterprising character, though he did not seem to take much interest in the iron speculation about to be narrated: and from some of the partizan pamphlets that were showered about so thickly during Hastings' trial, I learn that he must have died a little before it, broken in spirit and fortune.

John Farquhar is not unfamiliarly known to many of my readers as the individual who subsequently purchased Fonthill Abbey, from the cele-

brated Beckford. His peculiarities, his parsimonious habits, his shrewdness, his eye ever watchful over his interests, were sketched with great felicity in that cleverest of periodicals, Knight's Quarterly Magazine, in "An unpublished episode in the Life of Vathek."

Steel through opposing plate the magnet draws,
And steely atoms culls from dust and straws ;
And thus our hero, to his interest true,
• Gold through all bars and from each tangle drew.

But the qualities which emphatically make *the man*, as distinguished from the merely social man—the bold speculative genius, the independent character, the untiring perseverance, the readiness to grapple with obstacles, the skill to overcome them—these do not fall within the province of the light *littérateur*. They are written in an alphabet and a language of their own, impressed in indelible characters upon the freedom, the national character, or the commercial prosperity of the country, where such men have existed. They may be forgotten, or they may become inappreciable to careless observers in the lapse of years ; but they continue to exert an influence, not loud but deep, through time—as surely as are propagated the undulatory impulses

From world to luminous world afar,

though infinite to the failing sense may seem the spaces between. Such qualities mingled in the character of John Farquhar : they won for him prosperity in his lifetime : and respect from those whose respect compensated for the gibe of the jester.

The Memorial submitted by these gentlemen to the Council of Warren Hastings, I subjoin entire :—

HON'BLE SIR AND GENTLEMEN,—Having the greatest confidence that any scheme proposed for the advantage of the Hon'ble Company, or for the good of this country, will always be received in the most favorable, and discussed in the most candid manner at your Hon'ble Board, we beg leave to offer to your consideration the following plan, for casting the H. C.'s shot and shells in Bengal, and for working a lead mine lately discovered in Ramghur.

The first part of our plan, you well know, Gentlemen, is no new scheme ; for it appears by the following quotation from a letter of Lord Clive and

the Select Committee in the year 1765, that the casting of shot and shells in this country had been deemed by the Company an object of importance. "The iron-founder whom you sent out in the Kent died on his passage to this place; but as the casting of shot and shells in this country is an object of great importance, we strongly recommend that you will supply the loss as soon as possible, by sending three or four persons well versed in that business, that our whole design may not be frustrated by such an accident in future."—[No. 86 of Appendix to Report from the Select Committee of the House of Commons, Vol. 1.]

In consequence of this application, a Mr. St. Quintin was sent out; but he likewise died a short time after his arrival.

We suppose that on account of the death of those two founders, and of the great expense of the cannon foundry, the thoughts of this undertaking have been laid aside: for we conceive that every reason which at that time made it to be looked upon as an object of importance has ever since remained equally forcible, and the present aspect of the affairs of Europe appears to us a very powerful additional one.

Besides the advantages which the Honorable Company proposed to themselves by erecting an iron foundry in Bengal, we beg leave to mention some others, which we have reason to imagine were not at that time thought of. Should iron trucks, lately introduced for garrison gun carriages, be approved of by the Board of Ordnance, the supplying of them here would certainly be very desirable.

But the greatest object, and which perhaps in time may be esteemed of considerable importance not only to the Company, but even to the nation, is the casting of cannon and mortars of a quality, superior to that of the ordnance of any other state. For amongst the various ores produced in this country, there is one found in Beerbhoom, and in great abundance in Ramghur, which yields an iron so extremely soft, as to be fit for few of the common purposes of life: but this property renders it in an eminent degree superior to all other kinds, for almost every work in cast iron, and particularly for the fabrication of cannon.

This quality the celebrated M. Reaumur, M. Buffon, and some others of the most eminent French naturalists and mineralogists, have been long endeavouring to give to cast iron, principally with a view of improving the artillery,* and their labours have been much approved of by the Ministry. The same thing has been lately attempted in England, but without much success. The only iron ore that we know of, possessing nearly the same

* Witness two Memoirs by M. Buffon; the one on the "Smelting of Iron Ores," the other entitled, "Observations and Experiments made with a view to improve the Art of casting Iron Cannon. Paris 1775."

property, is one, amidst upwards of 60 different kinds, described by the Abbé Chappe, the produce of Siberia, and he regrets that the iron of it is not more known in France.

Now we conceive that by casting that peculiar iron in the form of kentledge, and by exchanging it with that of the Europe ships, such quantities of it could be sent to England, as would be a valuable addition to the Honourable Company's commerce, and the Europe kentledge might be sold to advantage for the use of country ships: for besides its being as admirably adapted to the fabrication of artillery, it would be of equal value for several other uses, but particularly for wire-drawing, and we flatter ourselves that it might be the means of securing to some of the British manufactures that superiority which they have hitherto possessed over those of every other nation.

The benefits which would accrue to this country in particular from the establishment of iron works would undoubtedly be very considerable, for at present vast numbers of cast iron pots, frying pans, and other utensils are yearly imported into Bengal from China, and are sold at very high rates; but by supplying the market with these articles manufactured within the Company's possessions, not only considerable sums would be saved, but a valuable branch would be added to the exports of this settlement. Cylinders for sugar mills, boilers for sugar works, salt works, saltpetre works, and for several other purposes are much wanted: and there is no doubt but they would greatly contribute to the improvement of those manufactures. Cast-iron rails, pale-gates, and rails for staircases and balconies, would add much to the beauty, as well as to the convenience of the houses in Bengal. And every merchant will allow, that iron kentledge for the country ships, especially such as are employed in the cotton trade, is an object of the greatest importance to the commerce of this port. How far it would be politic to give such encouragement to the manufacture of bar iron and steel in the Western Provinces, as would enable them to supply all Bengal, and consequently to prevent the other European nations from importing any, you, Gentlemen, are best able to judge. This would undoubtedly be highly beneficial to the country, both by furnishing the implements of agriculture readier and at a much cheaper rate than they can be procured for, at present; and by saving very considerable sums which now go to Balasore for Mahratta iron and steel, with which last article these provinces, you well know, Gentlemen, are very ill supplied. And certain it is, that this could in no way affect the interest of the mother country: for it is well known, that instead of being able to exports iron and steel of the produce of Great Britain, she is obliged to import at least two-thirds of what is used in her own manufacture. Nor will the increase

of iron works in England ever be judged good policy, as they have already destroyed some of the finest forests of oak, and as the workmen required for them can be employed to greater national advantage in the finer manufactures. We know that the French have, within a few years past, erected some very fine forges in the Isle of France, whether with the view of being able to undersell every other nation trading to India, in the articles of iron and steel, or of supplying the country powers with artillery in the most secret manner—we cannot pretend to say: but from the extreme lowness of the price of slaves there, we think it highly probable, that they will be enabled to do both as soon as the islands are sufficiently cultivated to produce provisions in plenty for their inhabitants, especially as it appears from what M. Bougainville (in his Voyage round the Earth,) says of those works, that their owners are supported by the French Government.

We shall now, Gentlemen, take the liberty to offer our sentiments with respect to the utility of working the lead mine in Ramghur. This mine consists of one small vein, which produces the ore known to mineralogists by the name of Potter's lead ore, because instead of being smelted on account of its metal, it is usually sold with greater advantage to those artificers for the purpose of glazing their wares. Now as no people make more use of earthenware than the natives of this country, and none are worse provided with materials for glazing it, the only means of rendering it neat or cleanly, or capable of containing fluids for any considerable time, we presume it would not be very difficult to introduce this improvement into common use. Besides, as all lead ores are known to contain a certain portion of silver, though generally too small to bear the expense of extracting it, we might perhaps find this ore worth treating upon that account, since fuel is remarkably cheap in Ramghur, and since the litharge into which the lead must be converted in order to obtain its silver, would answer still better the purpose of the potter than the raw ore.

Another beneficial consequence of working this mine would be, the supplying of the market at Patna with lead ore: for at present considerable quantities are carried thither, and sold by the name of *surma* (antimony). This ore is brought from countries to the westward of any of the Company's possessions, and is used by the country people chiefly for colouring their eyelids. We have had it very accurately assayed, and can pronounce with the utmost degree of certainty, that it is a true lead ore, not containing the smallest particle of antimony.*

* I might as well state here, on the strength of repeated analysis, that no small portion of what is sold at this day in the bazars, under the name of *surma*, is a sulphuret of lead without a particle of antimony. To those who physic their own horses, this hint may not be valueless.—S. G. T. H.

This undertaking would certainly prove very advantageous to the province of Ramghur, by procuring employment for a tribe of people found there and in the neighbouring provinces called *Coles*, who at present live in the jungles almost in the state of nature: yet although totally unacquainted with the conveniencies and comforts of a settled and civilized state of life, they are easily induced to quit their retreats, and are then found to become tractable and good labourers.

But we find our letter has extended to a length we little thought of: we shall therefore, Gentlemen, intrude no further upon your time, dedicated to affairs of so much greater moment, than to propose to you the terms which we think would enable us to carry our plan into execution.

After having obtained the best information in our power, we are of opinion that the pergunna called Jerriah, lying between the rivers Dummooda and Barracar in the province of Pachete, is the fittest situation for the iron work. The river Dummooda is navigable as high as that place; it abounds with iron ores, and has the singular advantage of being contiguous to the coal mines of which Messrs. Sumner and Heatly have a grant.

We propose then :—

I. That a sufficient quantity of land in the pergunna of Jerriah in Pachete, (or in any other province if appearing more advantageously situated for that purpose,) be assigned to us, for erecting the iron furnace and warehouses, and for the habitations of the workmen and labourers, to be held by the same tenure, by which Messrs. Touchet and Prinsep hold their lands.

That a like quantity of ground be granted to us for similar purposes, and on the same condition (if at present paying rent to the Company) at the lead-mine, but if Jaghire, that we be permitted to buy from the Jaghiredars such lands as may be requisite for the settlement of our people, and particularly Dungherra valley, without which it would be impossible to carry on the work, as the Jaghiredars we well know would levy such heavy contributions on our workmen, were they in their power, as would prevent them from working under higher wages than we could afford to give:—

II. That we be granted the exclusive privilege of working iron and steel in the European manner within any part of the Honorable Company's possessions which lie on the west side of the meridian of Burdwan, and of selling the produce of such manufacture, free from duty, in any place under the presidency of Fort William, for the term of nineteen years. That we be granted likewise the exclusive right of working the mines of whatever ores or minerals are not at present wrought by the country people within the aforesaid limits for the same number of years. By this article, however, we have no idea of prejudicing the rights of Messrs. Sumner and Heatly, who, you know, Gentlemen, have the exclusive privilege of

working the mines of coal, or of any mineral or metal, iron excepted, within certain districts of Beerbhoom and Pachete:—

III. That we enjoy the immediate protection of your Hon'ble Board, and be in no manner subject to the direction or control of the Burdwan Council, or of any of the Company's servants resident in the provinces within the above-mentioned limits, because should the Hon'ble Company ever be pleased to allow their officers of revenue the benefit of trade—it is obvious how much our works would interfere with their interest; and in case of disputes happening between the Zemindars or Farmers, and our Agents, they would sit as judges partly in their own cause. But that should any disputes arise, they may be determined by arbitration, or if becoming of a serious nature, by Commissioners sent from the Presidency—we obliging ourselves to abide by the decision of your Hon'ble Board on their report, and if found in the wrong, to pay the expense of such inquiry:—

IV. That we be permitted to employ Europeans in our works; we giving security, if required, for the good behaviour of those employed in the execution of that part of our plan which is of a private nature, but that such as may be required on account of the Hon'ble Company's work be on the same footing as the artificers of their contractors, who enjoy the greatest privileges:—

V. That we be allowed to take into partnership any person or persons whom we may at any time judge necessary to assist us in conducting our designs:—

VI. That on our part, we engage to erect furnaces and all other necessary works, and to keep workmen in constant readiness at our own expense, and that on application being made to us for any number of shot and shells, we oblige ourselves to begin the casting of them immediately, and to employ our furnaces for that purpose only, until such number be completed; and to deliver them at Fort William at four-fifths the price which the Hon'ble Company's shot and shells now stand them when landed at the same place:—

VII. That after the expiration of two years from the time of opening the lead mine, we allow the Company one-twentieth part of the profits which may accrue to us by the working of it, to be estimated by the profits of the two first years:—

VIII. That as the exemption from duty of our bar iron may be prejudicial to the interest of the persons who farm the *Loha mahals* in Beerbhoom, we engage to take their farms on the terms and conditions by which they are at present held.

We have now, Gentlemen, done ourselves the honour to lay our design before you: happy shall we be if it meet with your approbation, as we then



hope, and indeed make not the least doubt, that you will give us every encouragement and assistance, which may enable us to carry it into execution.

We have the honor to be, &c. &c.

T. MOTTE,

JOHN FARQUHAR.

Calcutta, the 4th Nov. 1777.

The proposal was the same day sent to Mr. Alexander Higginson and the Provincial Council of Burdwan, with instructions to report on the facts stated; whether the grant solicited would prove of detriment to the state or to private interests; to detail the statistics of the pergunna Jerriah, and to give such other information as may bear on the subject of the proposal.

Two months having elapsed without any answer being returned by the Burdwan Authorities, their memory was refreshed by a *takeed* at the suggestion of Mr. Farquhar, who from this time appears alone in the transactions connected with this speculation. I annex the reply complete:—

The Burdwan Council to Government.

HON'BLE SIR AND SIRS,—We have received your commands of the 6th instant, requiring an immediate reply to your letter of the 6th January last, respecting the proposals made by Messrs. Motte and Farquhar.

As the information you were pleased to require appeared to us of such a nature that the event of the proposals depended much upon our answer to the several points which we were directed to investigate, and as the distance of the pergunna Jerriah rendered it impracticable for us to ascertain the necessary facts without a local inquiry, we therefore stated them to Mr. Hewett at Jellda, who in consequence sent an Ameen named Seebnarain into the pergunna Jerriah, and who, you will perceive from the enclosed translation of his letter to Mr. Hewett, could not obtain any account of the amount of the Jaghire lands in that pergunna, though from the said letter it is fully evident, that the Zemindar and inhabitants appear to be pleased with the prospect of having an iron manufactory established in the country. The annual revenue to Government of the pergunna Jerriah is Rs. 2661. We have directed Mr. Hewett to use his endeavour to obtain further information, which should we receive, shall be immediately transmitted to you.

The death of the late Rajah of Beerbhoom we conceive has been the principal cause of our not having received the information required from that district. We however expect it daily, and will immediately transmit the particulars.

From the materials and information we have hitherto been able to obtain, we do not deem ourselves competent to give a definitive opinion, but as we conceive, allowing in general that the introduction of a new manufactory into any district must be beneficial to the public as well as to individuals, that the greatest difficulty Messrs. Motte and Farquhar will have to struggle with, will arise from the Jaghiredars and other landholders in Jerriah. We would therefore recommend to those gentlemen to make themselves acquainted with the difficulties which we apprehend, and to endeavour to obviate them, before they commence their manufactory, by reconciling the landholders and other inhabitants of the several districts in which they propose to be engaged.

Burdwan, the 13th March, 1778.

Report of Seebnarain to Mr. Hewett, referred to in the above.

Five days before my arrival, Rajah Mohunt Sing, with all his family and servants of every denomination, had gone into the jungles; not one of them attended me. I sent the perwanna you gave me for the Rajah by the hand of one of his people to him; upon reading the perwanna, he said that he was willing to furnish the articles of merchandize, (to wit iron,) but that he could not produce the Jaghiredars: that he would give his assistance in every thing which was required of him. This message he sent by one of his own people. If the Jaghiredars abscond, how is it possible for me to send you the accounts you require? You will be informed of every thing by the Moonshee, that not a cowree of money has been received upon account of the three Turoffs up to the month of Maug. The people are, through rascality, wandering up and down the country. Munsab Kell, &c. who went to Burdwan, have been arrived here three days. The Zemindars and all the people are pleased with the proposals for manufacturing the iron.

A more interesting report was sent in by Mr. Ramus, the Collector of Ramghur. This gentleman, at his entrance into the service, had been placed as assistant to Mr. Heatly in these districts. He was well known to his contemporaries as a devoted sportsman.

The Collector of Ramghur to Government.

HON'BLE SIR AND SIRs,—I have been honoured with your letter of the 6th instant, enclosing a copy of the proposals from Messrs. Motte and Farquhar, for casting the Hon'ble Company's shot and shells in Bengal, and

for working a lead mine lately discovered in Ramghur. In compliance with your orders, I do myself the honour of giving you every information in my power on the subject of both.

In the province of Ramghur, and in several contiguous pergunnas, an iron ore has been discovered these many years past, and worked both by the natives and by families who have long settled here merely to carry on the employ. They have ever met with great encouragement, as it has been productive of two very good consequences:—an inducement to the Calcutta merchants to negotiate in these parts; and a duty on its transportation, in which article the greatest part of the *Sayer* is comprehended, which enables the Rajah to make some addition to the Hon'ble Company's revenue: besides a consideration he annually receives from the heads of the trade for his permission and protection.

The iron is esteemed a very inferior sort, nor has the undertaking ever been carried on anywise extensively, owing to the great scarcity of labourers, (the country in general being much in want of ryots,) and their simple and tedious method of working it.

There is not a doubt from the quality of the ore, that the plan proposed may be prosecuted with the greatest ease; but not I imagine without being in some measure prejudicial to the country: as so capital an undertaking would require more workmen than these provinces could with convenience spare. Ramghur in particular severely feels that want, for there are many villages in it, and I may say pergunnas, almost wholly depopulated. The tribe of people called *Coles* are the immediate natives of Nagpore, who seldom leave that country but in small numbers, which even then proves hurtful to the neighbouring countries, unless shortly restored.

As the Company have never profited by such discovery any further than by a trifling increase of revenue, nor on the present mode does it promise any greater; should the proposal of Messrs. Motte and Farquhar appear to the Hon'ble Board advantageous, the only public detriment will be their great call for labourers, and the remission which the Rajah would apply for, to be made from his settlement, of as much as the duty and allowance annually amounts to.

With regard to private property, it would no farther be a prejudice than by obliging those to discontinue the business, who have for many years past been concerned in it, and who have made the necessary advances for a continuation; not that any of the labourers have purchased the spots, or entered into any agreement with the Rajah for his permission for any length.

The lead-mine having been so lately made known and worked to so trifling a degree, it is not in my power to give you any very particular in-

formation concerning it. The vein runs but a short way, but the appearance of the adjoining spots gives every reason to imagine it does not terminate in that one alone. The situation is southerly of Chattra, about 8 coss in the pergunna of Colrampore: the mine is at a place called Seedipore, the Jaghire of one of the Rajah's family, who concludes the mine not to be lead but *Surma*; on which account he has never taken any steps towards working it.

I should have visited the place immediately I was honoured with your letter to have more fully informed myself, did not the troubles which prevail in many places here render my presence at Chattra absolutely necessary.

Ramghur, 19th January, 1778.

On the 17th March, the Government wrote to the Burdwan Council to put Mr. Farquhar in possession of the iron mines of Pachete, and to grant him such formal authorities as may be requisite: he satisfying the Zemindars or Jaghiredars for such rights as they may possess. On Mr. Farquhar's receiving a notice to the same effect, he addressed Government in reply, begging that *Beerbhoom* might be inserted instead of *Pachete*, in the instructions to the Burdwan authorities, as the ores of Ramghur and Beerbhoom are by much the fittest for cast works: while those of Pachete on the contrary produce a brittle short iron, which, though good enough for shot and shells, is by no means proper for the fabrication of cannon. He also states his reason for specifying Jerriah, to have been its central situation between Beerbhoom and Ramghur, and concludes with *begging permission to observe that—*

“ Were he allowed to hold the iron farms at the rents which they at present yield to the Honourable Company, every source of dispute with the country people would be obviated, and the peons requisite for the collection of the duties would afford sufficient protection to the works against the hill people without a guard of Sepoys, which I am informed will otherwise be absolutely necessary.”

The Government made the requisite alteration of name, but took no notice of the concluding hint. Farquhar, however, was not the person to yield his point so easily; and without stirring from Calcutta, he not only repeated the application, but rather considerably increased its extent:—

*Mr. Farquhar to the Government.*

HON'BLE SIR AND GENTLEMEN,—It is with the greatest reluctance I bring myself to trouble you with a fresh application, but the many inconveniences I foresee I should have to labour under in executing your orders of the 20th February, if possessing no influence amongst the miners, oblige me once more to request that you will be pleased to grant me the farm of the duties on the Beerbhoom iron. And as this has no connection with the farms of the land, and yields to Government only 766 Rupees a-year, I flatter myself that you will not deem my request unreasonable.

I beg, Gentlemen, that you will likewise please to order that I be furnished with a letter of credit on the Burdwan Council, to the amount of five or six thousand Rupees for carrying on the works.

Calcutta, 28th April, 1778.

The Council ordered the farm of the iron mahals to be made over to Mr. Farquhar, but considered the advance unnecessary, as their orders of the 20th February, related to the experimental casting of four guns, which they now revoked.

Farquhar went down into Beerbhoom, and soon found his shrewdness sufficiently tasked by the natives, with regard to the settlements he was expected to make with the Zemindars.

Mr. Farquhar to Mr. Marriott and the Council of Burdwan.

GENTLEMEN,—I beg leave to trouble you for a few minutes on the subject of my farm of the iron mahals of Beerbhoom.

On my arrival here, I found that the rents had been raised the year before from 766 Rupees to 3,262 Rupees; at the same time it appeared by the papers of the Aurungs, that the whole collections did not amount nearly to that sum. I found likewise that the same person held the farm of the iron mahal and of the Noony pergunnah, and that at the very time when this increase was made on the mahals, he got an abatement of 4,471 Rupees on the pergunnah, by which he was in fact a gainer of 1,975 Rupees a-year.

The reason of this voluntary increase on the mahals was not difficult to discover. By this means the farmer imagined he had secured to himself the constant possession of them, as the people at the Aurungs were sensible that the sum collected was much less than this nominal jumma.

The Malgoozaree of Belputtah is estimated at 131 Rupees, on the supposition of there being sixteen *saals*, (furnaces,) but in reality there are

only eleven. Dehra Mourissa, Azimnagar, and Ahmednuggur are valued at 169 Rupees, where there has not been a single *saal*, nor scarcely an inhabitant since the famine. I would, Gentlemen, send proofs to you of what I advance, were not one of your members, (Mr. Pye,) perfectly acquainted with the facts.

I have likewise to observe, that the Governor and Council were pleased to direct that the farm should be let to me by your Board without mentioning a word of the Zemindar, as will appear by the enclosed letter. The Rajah's Dewan, however, says, that they are still included in his *doleputtah*, and of consequence that I must hold them in *cutkina* of him. I hope therefore, Gentlemen, that you will be pleased to order them to be struck out of the *doleputtah*, and to direct that the Honourable Company's Dewan receive the rents from me at the former jumma.

Beerbhoom, 15th October, 1778.

The Burdwan Council examined into these statements, and finding them true, addressed the supreme authority to the effect, that believing their intention to have been essential assistance to Mr. Farquhar, in establishing and prosecuting the business of an iron manufactory at Beerbhoom, they wished to be authorized:—*first*, to let the iron mahals to Mr. Farquhar on a fixed annual jumma of 766 Rupees; *second*, to receive the jumma from Mr. Farquhar, and to strike off its amount from the general jumma to be paid by the Zemindars; and *third*, to release Mr. Farquhar from all responsibility to the Zemindar of Beerbhoom. All this confirms the view that the property was vested in Government, who were free to improve their revenue derivable from it, the leases not being *mocurruree*, by farming it to the highest bidder, or to one at least who promised to increase its value.

It was agreed by Government to fix Farquhar's jumma at the original sum, but they did not fail to direct, that the land revenue of the Noony pergunnah should be raised to its proper assessment.

Relieved from these annoyances, Farquhar seems to have set to work with some ardour, but in a few months, we find him again importuning the Government for pecuniary assistance:—

Mr. Farquhar to the Government.

HONORABLE SIR AND GENTLEMEN,—Although you were pleased to countermand the directions you had given me last year, to make a trial

of the country ore for casting iron cannon, I have notwithstanding applied my whole attention to that object ever since. I had resolved not to trouble your Monorable Board for any pecuniary assistance, till I should be able to produce a gun as a specimen of my work. But the expense of cutting down jungle, of erecting a dwelling bungalow, and several necessary buildings for artificers, of preparing materials for forming a dam and of cutting part of a canal for supplying the bellows-wheel with water, has amounted to such a sum, that I find myself unable to go on with the work unless assisted by Government. And I trust, Gentlemen, that you will not suffer an undertaking to fail which was formerly approved by the Honorable Company, and was twice attempted to be carried into execution entirely at their expense.

I have estimated that it will require only fifteen thousand Rupees to finish the canal sluices, &c. and to erect one furnace capable of casting a 12-Pounder.

Should you be pleased to grant this sum, I make no doubt of your approving the following proposal. There are at present fifty matchlock-men maintained at the Company's expence, chiefly for the protection of the iron trade. As there is no check on their Sirdar, their number is never complete, nor is their appearance such as to keep the hill people in awe. Should you think fit, Gentlemen, to put them under my orders, to raise their pay from 3 to 4 Rupees, and to allow them 50 stand of arms, I would engage to clothe them uniformly, and to teach them to fire at a mark. They would then afford sufficient protection not only to the foundry, but to the adjacent country, which, in case of Capt. Browne's corps being recalled, will be much exposed to the incursions of the *Choars*.

Calcutta, 20th June, 1779.

J. FARQUHAR.

Government simply requested to be informed, in answer to this letter, the specific engagements into which Farquhar was willing to enter as a return for the assistance solicited. These, Farquhar lost no time in supplying:—

Mr. Farquhar to the Government.

HON'BLE SIR AND GENTLEMEN,—As success in casting guns is not absolutely certain, it is not in my power to enter into any agreement respecting them. But should I fail in bringing them to the requisite degree of per-

section, I conceive it will still be advantageous to have a foundry always in readiness for casting shot and shells. Mr. Osborne lately applied to me for 100 7-inch shells, which he was much in want of, and which it was not thought proper to spare from the stores. And some of our officers were not long ago reduced to the expedient of casting shells of a sort of bell metal for the reduction of several mud forts in the Doab. Besides, Gentlemen, I presume it will appear to you an object of some degree of importance to cast shot for the French guns that are already in our possession, or may be taken in the course of the war, otherwise they must be absolutely useless.

I propose then after sufficient time for finishing the works being allowed :—

First.—To deliver at the New Fort such shot and shells, as may have been required, at 15 per cwt. under what they at present stand the Hon'ble Company when landed at the same place, to the amount of the sum which your Hon'ble Board may be pleased to indulge me with.

Second.—To enter into an engagement for any number of years either now or after having made good the above sum to furnish whatever number of shot and shells may be demanded on the same terms, provided they be for the use of the Hon'ble Company's garrisons or armies; but that I may be allowed to supply country ships, or their captains or owners producing a licence signed by the Military Store Keeper, or any other officer authorized by Government.

Third.—To give security for faithfully fulfilling these articles.

Calcutta, 28th June, 1779.

J. FARQUHAR.

This letter was followed up by the present of a 6lb. shot as a specimen of his casting. It seems not to have been smooth, which he accounts for by the small size of the furnace which allowed charcoal and dross to enter the mould. He states also, that the furnace proposed to be erected will contain 15 cwt. of metal at a time.

On the receipt of this last shot, Government surrendered at discretion, and the advance of 15,000 Rupees was sanctioned, as well as the transference of the matchlock guard.

Farquhar now commenced in earnest. In the report on the proposed construction of the Rajmahl Canal,* furnished to Government, [July,

* If it were permitted to turn from the history of that which has been, to that which has *not* been—a parenthetical sigh might here be offered up to the memory of this undertaking; so ably sketched, and completed in all its details—on paper. “Heu! quanto minus est cum reliquis versari quam tui meminisse!” May we hope that circumstances will draw attention again to it!

1832,] by Colonel Forbes, the following allusions to his labours occur :—

Par. 115. That good building stone may be obtained in the vicinity of the More, we are aware from the fact, that in a locality adjoining it, the late Mr. Farquhar constructed a dam, (stated to have been of an excellent quality of this material,) for the purpose of turning a stream of water over the wheel of a mill proposed to be employed by him in rolling out iron prepared on the spot from the ore. This dam was considered by the late Mr. Cheap, of Surool, to present the best specimen of masonry at the time (forty years ago,) to be met with in India.

Par. 117. Broken up for its materials, and consequently neglected, it is believed that at present no part of the dam alluded to, remains. Those who knew Mr. Farquhar, will however acknowledge, that previous to embarking in such a speculation, no man was more likely to have been cautious in his enquiries, and few better able to conduct them.

Par. 118. Certain it is that had the time and talents devoted by Mr. Farquhar to the making of gunpowder been continued to his iron works, the art of manufacturing iron would ere now have been far enough advanced, to have importantly facilitated the construction of this Canal, and many other works of public utility.

Farquhar was not, however, permitted to proceed in peace. The unexpected manœuvre of renting the *loha mahal* direct from Government, had completely disconcerted the plans of annoyance already prepared by the landholders. Continual efforts were made to surprise the authorities into some orders that might afford ground for litigation on the right to the *loha mahal*. In the meantime new aurungs were established by the Zemindar, who used the uncontrolled power possessed by landholders over the peasantry of their estates, to ruin Farquhar in every way. His people were molested, fuel obstructed, miners bribed away, and perwannas for private furnaces issued.

On the 10th May 1784, a paper of proposals was presented to the Committee of Revenue, to farm Beerbhoom from Government. It contained the following paragraph :—

“That the farmer be allowed to examine the *hustabood* of the *loha mahal* which is included in the jumma, and under-farm it to such persons as the farmer shall like.”

The proposals were rejected. In August, the Zemindar Zemaun Khan presented a Wazeeb-ul-urz, in which he treats the *loha mahal* as property as a matter of course.

I request permission to encourage and improve the *iron mahal* in my zemindary, the produce of which, provided I am allowed to attend to the improvement of it without interruption or check, will in a great measure make up for the want of assets in the *malgoozary mahals*.

Committee's Order.—The above *iron mahal* was granted to Mr. Farquhar by the Honorable the Governor General in Council, and must remain in his possession according to the terms of the grant, as he has hitherto held it.

In September, Farquhar represented the state of affairs to the Board of Revenue, and the attempts the Zemindar made to oust him. He pointed out clearly, that he was only responsible to Government for the *loha mahal*; but that no official alteration had been made in the Rajah's *sunnud* as directed in October 1778, and the annoyance had been renewed: he forwarded his *sunnuds*, such as they were. The Board referred the matter to Government, and received orders to act vigorously. A perwanna was despatched to Beerbhoom, forbidding the Zemindar to interfere with the *iron mahal*, ordering him to send in a list of the new furnaces built, and to produce his authority for so doing.

In 1786, new authorities having arisen, 'who knew not Joseph,' the attack was immediately renewed. The Zemindar, in arrears to Government, put down Farquhar as his debtor for the rent due on the *loha mahal* at 953 Rupees, and requested the Collector to levy accordingly. Farquhar, as might be expected, calmly denied any connection whatever with the Zemindar. The Collector was puzzled; there were records, it is true, in his office, but to disturb their venerable dust! a reference for orders was made to the Board. Farquhar's *sunnuds* were at that moment in the records of the Board, never having been returned. A call was made on him to produce them. He preserved a solemn silence. The call was repeated; he was deaf. After four letters, he wrote back to request the return of certain papers deposited with them, which being done he forwarded them back with a new *lifafah* as the papers required, accompanied by a dry apologetic epistle. Here concluded this chapter of annoyances.

On his appointment to the gunpowder manufactory at Pulta about 1789, he relinquished the iron speculation, to devote the energies of his mind to the new pursuit by which, to quote Col. Forbes again, "he afterwards amassed so enormous a fortune." He however preserved

the farm of the *loha mahal* to so late a period as 1795. It must then have reverted to the Zemindar. This personage disposed of parts of his estate at this time, and the purchasers commenced to levy the proprietary dues on the iron mines within their lots.

In 1799, the Rajah's affairs having become inextricably involved, the whole zemindary was put up to sale, and the lot containing the *loha mahal* was knocked down to Bustonchurn Hazra. The new owner immediately examined into all the aurungs of the zemindary, and disallowing the claim made by the private purchasers above alluded to, sued them for recovery of possession and restitution of mesne profits. The zillah judge decided in his favor. The decree was affirmed by the Provincial Court at Moorshedabad, who further added the singular clause, "that the property of all aurungs, mines, smelting houses, and other iron works lying within that district was vested in Bustonchurn Hazra." The decree was confirmed on a further appeal to the Sudder Dewanny Adalat, who however struck off the clause alluded to above, as irrelevant to the precise question, and not based on sufficient investigation. And so it certainly was. Every one had been at liberty to dig out ore from the mines, provided he paid the duty: nor had there been objections to his building his own smelting houses, &c. with the same proviso. The Zemindar certainly exercised a right to prevent new aurungs if he chose, as the supervision of them required a new establishment of officers. But the property of the works was undoubtedly in the private individuals, who built them in the aurung.

The quarrel was revived between the parties, and the Sudder Dewanny found it necessary to define the exact privileges which the property of the *loha mahal* now made perpetual, conveyed to its holder.

The owner of the *loha mahal* had a right to all the ore of the zemindary: the sums levied on the iron manufactured at the aurungs are viewed as the consideration or price taken by him for the ore appropriated by the manufacturers. No ores were to be manufactured without paying him the established dues. He was entitled to possession of the aurungs to secure the receipt of these dues. He was entitled to cause new mines of iron ore to be opened anywhere, on condition of making to the landholder in whose estate it lay, full and liberal compensation for the value of any land which may be rendered unfit for cultivation by opening the mine.

He shall not be entitled to establish new aurungs without previously obtaining the consent of the landholder for the land. He is also prevented from attempting to

restrain the manufacture of iron, and from attempting to exact from those concerned in it, any dues or payments which have not been customarily rendered.

The landholders on the other hand could not prevent any individual from taking ore from the *established* mines, and carrying it to any of the *aurangs* of the owner of the *mahal*, nor could they exact any fines or consideration for the ores so taken.

The decree of which the above is the substance, was passed in July 1811, by Messrs. Harington and Stuart, and completely defines the rights of the *loha mahal*: It is necessary to state, that the Collector in disposing of the *loha mahal* in 1799, did not specify to Government whether he had put up the entire *mahal*, but entered it as part of the *jaedad* of a particular district, Dehoche. The Court therefore referred the matter to the Board, (previous to their first decree,) enquiring whether they were willing to agitate any claim on behalf of Government with regard to the property of ore in the whole district. The intention of the reference was, that the Board might take some measure to subdivide the *mahal*, conveying to each lot the property of iron within its limits. No answer was ever returned by the Board, and the Court consequently limited the powers of the holder so specifically as is done above, to prevent the capricious or selfish crushing of all industry. The tenure exists on these conditions at the present day.—[*Sudder Dewanny Reports*, Vol. I. 337 et seq.]

N. B.—During Farquhar's labours, I find from an old newspaper, called *Hickey's Gazette*, published in Calcutta, that the market price of Beerbhoom hook iron was 5 Rupees per maund, Balasore hook iron at 6-8, and English at 10 and 11.

Journal of a Tour through parts of the Panjab and Affghanistan, in the year 1837. By Agha Abbas of Shiraz, arranged and translated by Major. R. LEECH, by whom the tour was planned and instructions furnished. From the Secretariat of the Government of India.

• INTRODUCTION.

In the summer of 1837, leaving my late chief (then) Captain Alexander Burnes at Dera Ghazee Khan, and accompanied by my fellow-traveller Dr. Lord, I paid a visit to Multan, for the purpose of collecting information of a commercial nature.

There Agha Abbas was introduced to me by my servants, as a man Meeting with Agha Abbas. professing some knowledge of Farriery. He undertook the cure of one of my horses, and on our departure from Multan, followed me with it to Karabagh, where having no further occasion for his services, I wished to discharge him. He however made such offers of unrequitable services, talked in Persian phrase of "spilling his blood at my stirrup," and detailed such a list of varied accomplishments he was the possessor of, (reading and writing not included,) that I was induced to keep him on. To one of these accomplishments he knew I could bear witness, besides the cure of the horse; this was his causing loud explosions in water, by igniting a white powder on its surface, with a drop of liquid from a vial, much to the astonishment of the idlers of Multan.

At different subsequent periods, I gained from him the following abstract of his previous history :—

His previous History. He was originally an inhabitant of Shiraz, the place of his birth, and was employed by Prince Hasan Alee Meerza, governor of Kirman. On the seizure of that prince by his elder brother Abbas Meerza, Agha Abbas fled, and travelled via Bamm, Narmasher, Seistan, Candahar and Cabool to Peshawur, where he met an old acquaintance, Naib Abdu Samad, who was raising an infantry regiment for Sirdar Sultan Mahommad Khan, and took service under him.

He afterwards accompanied the naib on his being obliged precipitately to leave Peshawur, on account of one of Sultan Mahommad Khan's brothers conceiving an enmity against him, to Cabool, where



he became adjutant of the regiment Abdu Samad raised for Dost Mahommad Khan; and as such, was present in the action fought at Candahar on the 2nd July 1834, with Shah Shuja-ul-Mulk.

On his return to Cabool, he quarrelled with his patron and commandant on the subject of the uniform of the regiment, which he refused to wear, threw up his appointment in disgust, and retired from the service.

Quitting Cabool, he proceeded viâ Peshawur to Attock, where a display of his "*patakahs*," or crackers, procured him for a time employment with Cashmeeree Singh, one of the sons of Maharajah Runjeet Singh, whom he accompanied to Lahore, from which place he requested leave to return home to Persia, the value of his services not being fully appreciated, and I therefore, according to his account, encountered him on his road to Persia viâ Scinde.

From Karabagh we proceeded viâ Rawal Pindee to Attock. At this latter place, I planned and proposed to Agha Abbas this tour,

Tour proposed. which he agreed to attempt. Furnishing him with minute instructions, a small advance of money, a

Persian writer and a guide, I dismissed him; and again separated from Captain Burnes and proceeded up the river Indus to explore the fords.

On my return to Peshawur from this trip, Agha Abbas, to my astonishment, again presented himself, with a doleful story of his two companions having deserted him at Rawal Pindee.

Leaving the choice of fresh men to his own discretion, and making him a further advance of money, I again dismissed him; and did not see or hear of him, until on the completion of his journey, he joined me at Candahar in the early part of 1838, with the following account of

his labours and adventures, which has been translated, partly from his original account written by his companion from his own dictation; and partly from his answers to questions put by myself, on subjects he had at first either entirely omitted, or only slightly touched on.

N. B.—It must be borne in mind, that as only the four cardinal points of the compass are used as bearing: a "North" bearing has a range from "North-West" to "North-East," and in like manner the other three points.

Topography.

FORMAL.

On getting my dismissal from Major Leech, an advance of twenty-five Preparation. Nanakshye rupees, and being furnished by Mr. Lord's native doctor with a number of small packages labelled in English, containing the commonest medicines, to enable me to act at times as a *hakeem*, I proceeded to organize my party. This consisted of myself, a Party. Persian writer, two guides, and a servant; all habited and equipped as *fakeers*.

As some compensation for the disappointment felt by my employer at finding me at Peshawur, instead of hearing of me well on my journey, I subjoin the following information, gained during my detention at that city :—

Number of jarebs in the province of Peshawur according to the Land estimate of division of Sultan Mahmood of Ghuznee 15,76,000 Peshawur. jarebs, at the rate of 3,94,000 jarebs for each of the following four divisions; viz.

1st Division.—Yusafzyes, Bajour, Mandour, Chagharzyes, Byán.

2nd Division.—Teera, Bangash-i-Bala, Bangash-i-Pacén, Bannoo Daman, Khost, Murwat.

3rd Division.—Khattak-i-Bala, Khattak-i-Pacén, Wazeeree, Too-rees, Jajeas.

4th Division.—Khaleels, Momands, Daoodzyes, Khalisa-i-Shareefa, Duabah, Hashnagar, Baghayat-i-Bagram.

The revenue of Peshawur under the Sadozye kings was 9,51,000 Revenue. rupees, 2,40,000 of which was distributed in church lands to the Mullahs; and the remainder, 7,11,000 reached the royal treasury.

Peshawur is said to contain 7,761 houses, of this number 5,566 are Number of Houses. private dwellings, and 2,195 shops.

On the 7th of Jamadee-ussanee left Peshawur, and passing the Barah rivulet, reached Pabbee, a distance of 6 kos.

8th Jamadee-ussanee.—Travelled eleven kos to Akorah, passing at five kos Nosherah, where there is a garrison of one Akorah. hundred Sikhs, as well as at a Baolee, (well) on the road. At Nosherah I witnessed an act of Sikh tyranny: three of the

Sikh tyranny. country people, Mahommadans, had been pressed to labour the day before, and at night had been shot on a pretended suspicion of being thieves. Their bodies were hung

on a gallows, and a fire had evidently been lit underneath, from the dreadful manner in which they were scorched.

9th Jamadee-ussanee.—Proceeded to Attock five kos through the Gidar galee (jackall defile) and across the river Indus; saw the body of a Khatak, suspended over the gate of the town of Khyrabad, which

Another act of ty- is opposite to that of Attock, and on the right bank, in
ranny. company with a dog, and scorched like the body at

Nosherah. He had been killed by a Sikh on some false pretence. I

also witnessed the wreck of two boats when crossing

Wreck on the Indus. the river: they contained a wedding party, who were conveying a bride to her husband; four men of the crew alone escaped.

I remained four days at Attock.

13th Jamadee-ussanee.—Reached Haidaro (Hazro,) a distance of

Haidaro. eight kos, passing at three kos the village of Daman, and at three and a half kos, that of Formul-

liyan. There is a noted robber in these parts, by name Sher Zaman,

Famous Robber. who lives in the Gungar hills. He is in rebellion against the Sikhs, and one of their most deadly

enemies. He seldom plunders a caffila unless he finds a Sikh in it, a single soul of which caste he never spares.

15th Jamadee-ussanee.—Proceeded four kos to Burhan, crossing the Haro river.

16th Jamadee-ussanee.—Travelled three kos to Phattargad, a de-

Phattargad. pendency of Hasan Abdal. There are one hundred houses on the mound, and fifty below. There are two

Hindoo shops. The inhabitants have large herds and flocks, and are of the tribe of Gujar. Their supply of water is half kos distant, where there is a water mill, and forty or fifty trees. The head of the village, Malik Raheemdad. In the evening I was prevented from sleeping in the mosque, and had to content myself with the roof of the mill.

Inhospitality. I could only account for this inhospitality by supposing, that my wearing my mustachios untrimmed, betrayed me as a Sheeah. To the west is the district of Futteh Jung.

17th Jamadee-ussanee.—Reached Pindi Nonsberce, a distance of seven kos over a bad road, intercepted by ravines.

Nonsberce. There are 150 houses.* The inhabitants are chiefly weavers of coarse cotton and woollen cloths. Their cultivation de-

pende on the rains. The head of the place is Malik Ghulam Rasool, by tribe a Katar. The governor, a Sikh, by name Mán Singh, had that day forced the daughter of a Musselman goldsmith. The inhabitants rose and took to arms, killed one of Mán Singh's attendants, and severely beat the governor himself, forcing him to flee, and then took away their families to the hills, as did all the neighbouring villagers, coming down at night and watching their fields and houses, armed. The village was so deserted, that I did not think it safe to put up in the mosque, but spent the night with one of these armed parties in a house in the purlieus. I afterwards heard that the outrage here mentioned was brought to the knowledge of Runjeet Singh, but I know not whether the aggrieved obtained redress or not.

18th Jamadee-ussanee.—Made a stage of eight kos, over a road much broken with ascents and descents, and ravines.

Tahlan.

Tahlan, a place consisting of seventy houses, and containing two Hindoos shops; fourteen Cashmeer dancing boys had also taken up their residence here. The name of the head man is Allanoor, by tribe a Jat. This place is dependent on Rawul Pindee. I spent the night with the Cashmeerees.

19th Jamadee-ussanee.—Proceeded seven kos over ascents and descents, and through ravines and jungle, in which I lost my road, and had to wait at a tank, until a herdsman coming to water his cattle,

Talan.

set me right to Talan, a village on a rising ground, containing two hundred houses, fifteen Hindoo shops, and four of shoemakers. The inhabitants are weavers of coarse cotton and woollen cloths, and pay a revenue of 1000 rupees. There are eight wells. The name of the head man is Nasarulla. Here I was detained two nights on account of the indisposition of the Persian writer.

21st Jamadee-ussanee.—Three kos to Chotra, which is a place containing 300 houses of Musselmans, and forty of

Chotra.

Hindoos, situated partly on an eminence, and partly on the bank of the river Sawan. There are forty weavers, partly Cashmeerians and partly natives of Patwar. The

River Sawan.

revenue is 1,200 rupees. The river is very deep, and not used in cultivation, which is carried on by means of forty wells. There are two head men named Habo khan, by tribe a Budhar,

and Shamee Khan, by tribe an Awan. There are no shops; the Hindoos transact business in their houses. One of my party going to make a purchase, entered into a quarrel with a Sikh, and came home wounded.

22nd Jamadee-ussanee.—Travelled nine kos to Bher, a place containing seventy houses, but no shops. The road
Bher. uneven. The name of the head man Habeebulla, by
tribe a Ratyal. Revenue 200 rupees.

23rd Jamadee-ussanee.—Proceeded three kos to Doulatana, a place containing two hundred houses of Musselmans and
Doulatana. eighty of Hindoos: seven shops and three weavers.
Revenue 600 Rupees. The inhabitants are of the caste Alpyals, and the head men are Kareemdeen, Nizamodeen, and Walee Mahommed.

24th Jamadee-ussanee.—Travelled six kos over bad ravines to
Kamtareela. Kamtareela, containing two hundred houses, eight
Hindoo shops and twenty weavers. The place however is much dilapidated. Its revenue is 1000 rupees. The cultivation depends on the rain. There are two dilapidated mosques in the suburbs. The head man is Hadayatulla, by tribe an Awan. At this place my fakeer's habiliments attracted charity.

25th Jamadee-ussanee.—Travelled five kos to Peer Janjoot, containing two houses of Mullahs, styled "Myan," three
Peer Janjoot. shops of Hindoos, and twenty houses of weavers, cotton cleaners, and gardeners. The "Myans" farm the place for a yearly nazarana of two hundred rupees. This is a neat, pleasantly situated place surrounded by trees, and having a fine tank stocked with fish. I stopped here another day, and my appearance attracted suspicion of my being an alchymist: many would-be smatterers in the art came to prove me, and fortunately, I found them more ignorant on the subject than myself; as I had not, when first asked, wisely denied all

acquaintance with it. One man more foolish than
Alchemy. the rest, catching at some dark hint I purposely let drop to confuse them, followed me a whole stage, intreating me to impart something of my invaluable secret to him. This I faithfully promised to do on my return, which I pretended would be very speedy.

27th Jamadee-ussanee.—Proceeded six kos, passing for three kos over estony pass to Dumblee, a village situated on
Dumblee. an eminence, and containing five hundred houses,

and a new bazar of one hundred shops, laid out in two streets, at right angles to and intersecting each other, the residence of Rajah Fazldad Khan, who is by tribe a Bagyal. There are eight wells with Persian wheels, and the revenue is one thousand rupees.

28th Jamadee-ussanee.—Travelled five kos to Rotas, the head man of which place is Fazldad Khan, by caste a Bagyal. He formerly furnished a contingent of 500 horse; and enjoyed the whole of Rotas, now under the rule of Rajah Gulab Sing. He enjoys 7,000 rupees, 1300 from Dumbelee and 5,700 rupees from other districts, and has no power. He has now retired to Dumbelee, where he resides. Rotas contains one thousand houses, and one hundred shops; has twelve gates, three to the East, five to the West, two to the North and two to the South: four of which alone are open. The district of Rotas is divided into fourteen tappas, one of which, Taliyala, under Waleedad Khan, is in jagire to Shah Zadah Karak Singh; one Shah Jahenee, under Shah Ahmed to Mishur Jesah, keeper of the royal toshakhanah; and the remaining twelve are in jagire to Rajah Gulab Singh. The revenue of Rotas was formerly three lakhs of rupees, now it only amounts to one lakh.

The twelve tappas of Rajah Gulab Singh are as follows: 1st. Tappa Shakra, under Choudree Ghulam Husen, by caste a Gujar; 2nd. Tappa Salama, under Abdulla Khan Gujar; 3rd. Tappa Doulatalee, under Azeemulla Khan Bagyal; 4th. Tappa Sikandar, under Azeemulla and Imam Bakhsh Bagyal; 5th. Tappa Choutlee, under Walo Khan Malyar; 6th. Tappa Rajoo, under Choudree Suleman Gujar; 7th. Tappa Sangoe, under Mahdee Khan Bagyal; 8th. Tappa Tirhala, under Fazaldad Khan Bagyal; 9th. Tappa Shibalee, under Mado Khan Bagyal; 10th. Tappa Eesyala, under Khuda Bakhsh, and Khuda Yar Jat; 11th. Tappa Kunar, under Lal Beg and Meerza Khan Moghuls; 12th. Tappa Pidree, under Yoosaf Khan Bagyal.

29th Jamadee-ussanee.—Travelled six kos to Sangoe, passing half way a river, the remaining half over sand through cultivation. The place contains six hundred houses and seventeen shops of Hindoos. Here Mishur Jesah has built a fine upper-storied house for his own accommodation. Outside the village, to the North, is a fort with four towers, garrisoned by twelve of Rajah Gulab

Singh's sepoy. There are eight wells. The head men are Khuda Bukhsh and Khuda Yar, by tribe Bagyals. The revenue is two thousand rupees.

1st Rajab.—Proceeded seven kos over a plain, and through cultivation to Koohar, a place containing one thousand and five hundred houses and eighty shops. Within town to the South is a small mud fort that commands it, garrisoned by eight sepoy. There are twenty wells. The head man is Noor Alam Khan, a Kutubshye Awan. The revenue formerly was 2,500 rupees; it is now 8,000 rupees.

On arriving I put up in the mosque, where soon after Noor Alam Khan and his son came to prayers. Observing an excrescence on the temple of the latter, I offered my services to remove it. This was done in a few hours after the application of a liquid I had with me. For this piece of service, Noor Alam invited me to his house and entertained me; gave one of my men a white shalakee, and on my departure, packed up two days' provisions for me. I learnt that Noor Alam had once embroiled himself with the Sikhs, by killing one of the garrison for some act of tyranny committed.

3rd Rajab.—Travelled ten kos to Kotala, over a hilly road for four kos and through a defile. There is a tank on the hilly ground. The road is then sandy, and abounding in ravines. To the West is the town of Guzerat. There are eighty four villages dependent on Kotala. The revenue is 5,000 rupees. There are two thousand and five hundred houses. The old bazar contains two hundred shops; and the new one, which has been laid out in two lines intersecting each other at right angles, seventy shops. There are sixty-seven wells for cultivation. The head man is Abdulla Khan, by cast a Gujar.

4th Rajab.—Proceeded five kos to Rasoolnagar, called by the Sikhs Ramnagar, crossing the Chenab. The town is surrounded by a mud wall, and has six gates, and a garrison of fifty men, whose yearly pay is 300 rupees; but they are only paid for ten months. The government of the place is entrusted to Jawahar Singh, who receives on account of pay from the amount of the farm of the thanadaree and adalat 1,900 rupees; the whole amount being 2,500 ru-

pees; he is a native of Ramnagar. The other taxes of the place are collected by Rajah Gulab Singh. The town contains eight thousand houses chiefly of mud, and six hundred and fifty shops, seventeen mosques, and fifteen dhurmsalas and thakoor divalas. There were formerly eighty-four villages dependent on Rasoolnagar, that are now given away in separate jagires. There are eighty-four wells for cultivation, which are all distributed in jagires to Brahmins. The inhabitants are Musselmans. The revenue formerly was three lakhs of rupees. The

Former Chief.

former chief of this place was Ghulam Kadar Khan, by tribe a Chatha. He has now taken up his abode in Ramkee, and has employment in Runjeet Singh's gorchars, on a salary of 400 rupees. When chief, he could collect several thousand men, and has often opposed Runjeet Singh and his father in the field.

Here my funds ran short, and the Persian writer and cossid became clamorous for pay. Knowing that a man of my employer's, by

Diversion to Umritsir.

name Nursing, was at Umritsir on a tour, having similar objects to my own; I set out for that city, promising to return in nine days. On my arrival at Umritsir, my application to Nursing proved unsuccessful; but I fortunately encountered some Persian and Cabool acquaintances; one of them, by name Agha Rajab Alee Khan, lent me 280 rupees, and paid for 45 rupees worth of pedlery that I bought for my journey, and I set off on my return, accompanied by my creditor's uncle, who was to be repaid at Cabool. On my return to Rasoolnagar, having overstayed

Disappearance of Meerza.

my time by two days, I found that the Persian writer, tired of waiting, had disappeared with my notes. I lost no time in following him by double marches; on arriving at Koohar, I found he had left the preceding night; here I was no longer able to follow him on foot. Alam Khan lent me a horse and a guide, for which I presented him with a looking glass. On arriving at Rotas, I found the Meerza in the mosque. After a deal of coaxing, I induced him to return with me to Koohar, where I paid all my companions their wages, and got them to accompany me further on my journey.

21st Rajab.—Started for Khurd Chotala, arriving in three kos at the river Jelam. The place contains two hundred houses and eight wells for cultivation. The inhabitants

Khurd Chotala.

are Moghuls and Jats; the head man is Akir Khan Moghul. This stage was five kos. The revenue is 800 rupees including the district of Jalalpoor.

22nd Rajab.—Proceeded eight kos to Jalalpoor, which is situated on the side of a hill, below which runs the river.

Jalalpoor.

It contains two thousand houses and seventy shops, and has fifteen wells for cultivation. In the town is a small mud fort with four bastions, garrisoned by ten men of Rajah Gulab Singh. Revenue 16,000 rupees. The head man is Sher Khan, by caste a Janjooa.

23rd Rajab.—Travelled ten kos to Chaki Hameed, passing Sherpoor at three kos. The place contains two hundred houses

Chaki Hameed.

and two shops. There are fifteen wells for cultivation.

The revenue is 1,500 rupees, including the district of Pind Dadan Khan; the head man is Rajah Futteh Khan, by caste a Jalab. On arriving at the place, the Rajah was seated in a *takya*, and conversation ensued, in which he enquired my native town, and on learning it, invited me to his house, where he entertained me, and produced spirits in the course of the evening on account of my successfully prescribing for his son's and sister's excrescences; he detained me as his guest three days.

27th Rajab.—Travelled to Pind Dadan Khan, which consists of

Pind Dadan Khan.

three divisions, distant from each other from two to three hundred yards; one of which only is properly

called Pind Dadan Khan; it contains three thousand houses and three bazars of about three hundred shops. There are three gates to the town, but the surrounding wall is so dilapidated, that there are thoroughfares in all directions. Outside of the town to the west, is a mud fort with four bastions, in which there is stabling for thirty of Rajah Gulab Singh's horses, and a garrison of thirty sepoy under one Takurdass. There is also a small iron gun outside the fort. There were thirty or forty heaps of salt, containing about 5,00,000 maunds, covered with a coating of mud to render them water proof. There is a large steel-yard here for weighing the salt, which is allowed to be sold no where else. The other division or suburb is called Kot-i-

Kot-i-Sultan.

Sultan, containing five hundred houses, and a bazar of fifty shops. There are two gates, one to the north,

and the other to the south, and the place is surrounded by gardens. The name of the other division or suburb is Kot-i-Sahib Khan.

Khan, under a man of that name. It contains six hundred houses, and a bazar of forty shops, but no gates, and there are thoroughfares on all sides. There are fifty wells for cultivation, twenty of which alone are in repair. The price of grain, &c. I found as follows: wheat six seers the rupee, ghee two and a half seers, oil eight seers, rice sixteen seers, mash one maund, cotton four and a half seers, barley twenty seers. All the timber brought down by the river in the flood, is considered government property. The chiefs are Rajah Zabardast Khan, Sahib Khan and Disher Khan, by tribe Gogids. The place is bounded on the north by the salt range, on the south by the river Jelum. The revenue, besides the six tappas, amounts to 35,000 rupees. The six Tappas are as follow:—

1st. Tappa-i-Pind Dadan Khan, generally known as Tappa-i-Jalab,

Six Tappas. under Ahmed Khan. Revenue 20,000 rupees.

2nd. Tappa Ahmadabad, under Zulfkar Khan. Revenue 60,000 rupees.

3rd. Tappa Myanee, under Mahammad Khan, by tribe a Jat. Revenue 25,000 rupees.

4th. Tappa Pahra, under Noor Khan Moghul now in exile. Revenue 80,000 rupees.

5th. Tappa Barah, under Rahmat Khan. Revenue 16,000 rupees.

6th. Tappa Dannee, under Mahommed Khan, by tribe a Babad. Revenue 100,000 rupees.

There are in all eight salt mines; four only are worked: the names

Salt Mines. of those that are shut are as follow: Sardee, Neelawan, Durnala, Chotana. The latter is said to contain veins

of copper and lead. The inhabitants of the neighbourhood subsist by cultivation. The reason of the closing of the four mines is on account of there not being a sufficient demand for the produce. The rate at the four mines that are at work is the same. Sepoys of Rajah Gulab Singh are stationed over the mines, to prevent the smuggling

Smuggling. of salt, which, to any extent is punished by confiscation of property. In consequence of the heavy fines,

the miners themselves live on bread without salt. The government employ fakeers as spies, to try by begging, to discover the miners,

who use salt in their bread. If the miners are found stealing a seer or two, they are obliged to extract twelve *goonees* of salt for one rupee, each *goonee* containing two and a half maunds. The government pay one rupee nominally for sixteen maunds, which quantity weighs actually twenty maunds.

The hire of carriage to Pind Dadan Khan is 1 rupee per twenty maunds from all the mines, except the Makraj one,
 Hire of Carriage. the hire from which is 1 rupee for sixteen maunds.

The camels on which the salt is carried are all the property of Rajah Gulab Singh. The merchants, who make wholesale purchases, get the salt at $1\frac{1}{2}$ rupee the maund, others pay 2 rupees. Formerly the tax on the salt amounted to 4 lakhs of rupees. After the visit of Captain Wade, the farm rose to 8 and 9 lakhs, afterwards to 12

Salt Farm. lakhs, then to 14, at which I found it; as far as 25 lakhs are said to be realized. Rajah Gulab

Singh has farmed the mines from Maharajah Runjeet Singh. The labourers, who carry the salt out from the mines, are paid 1, 2 and 3 annas the day. Formerly one miner and two labourers got paid by the day one rupee;—the labourers being mostly males and females, adult and children, and the miner's own family. None but the experienced miners of the place can dig the salt. The labourers, when the salt is dug, bring it out by the aid of lamps in baskets, which they carry on their heads. Their clothes are completely blackened. The miners told me an anecdote, which was this: During Captain Wade's visit to the mines, when he was in one of the large

Captain Wade. chambers, Rajah Gulab Singh, jealous of a close survey being made, ordered the miners to throw up salt from behind the visitor, so as to fall in showers from above about him, and then to get up a cry that the roof was falling in, so as to cause his speedy departure. This stratagem succeeded. The galleries are driven under ground to the length of several hundred yards. The

Mines at work. four mines that are at work are Khur Chotana, Korah, Kerah, Makraj. The inhabitants of the neighbourhood of these mines do not cultivate; but depend on their labour in the mines. The salt of these mines appears perfectly inexhaustible. Each miner digs from fifteen to twenty maunds a day.

There are one hundred houses in the vicinity of the Chotana mine, and no cultivation: the head man is Shamo Khan Janjooa.

There is no cultivation at the Korah mine, and the houses are on an eminence. There is no water nearer than half kos, and that is rain water. The head man is Faizbakhsh, by tribe a Jalab. To the North is the Dannee Darra. There are two hundred stone huts in the neighbourhood of the Kerah mine; but no cultivation. They have none but rain water.

There are two hundred stone huts in the neighbourhood of the Makraj mine, and no cultivation. There are two running streams, one fresh and one salt. The head man is Karamdeen, by cast a Gogir.

I went to most of the mines myself. They have all one entrance each, the galleries run through red earth, and the salt lies in veins

Interior of mines. which the miners follow, until exhausted, when they proceed in a fresh direction; some of the shafts are sunk so low, that they have come upon water; other galleries proceed so high, that light is let in from the top of the ground. Many accidents, some fatal, occur, by the falling in of the roofs of the chambers.

Accidents. While I was in one of the mines, a labourer's arm was broken by the fall of a block of salt, and a general rush, headed of course by myself, was made for the open air. I saw one miner, who had lost his right arm by an accident, digging with his left.

The galleries are so dark, narrow, and winding, and so numerous, that it is impossible to traverse them without a light and guide.

The warmth of the mines is very oppressive, and the reflection of the labourers' lamps on the crystal roofs of the chamber has a very beautiful effect. The mines of Neelawan and Khur Chotata are the finest.

The miners separate the blocks by picking round the two sides and bottom, and then detach it from the top by heavy blows. The blocks generally weigh four maunds. The chips are collected by women and children. The miner's tool is a pick, of about thirteen

Tools. inches long, having a sharp point at one end, and the other end about three inches square, which serves as a hammer. It is furnished with a wooden handle about a guz long.

Rájah Guláb Singh, besides the farm of the salt mines, farms the Rajah's Farm. following ferries and districts, for 10 lakhs of rupees. Ferries—Bawal, Hareea, Bed, Bhera, Khushab, Saeewal, Dhannee, Ahmadabad, Jalalpoor, Meeanee, Makhad.

The districts are—Jalab, Bhera, Chakar, Bher, Yar, Saeewal, Dhannee, Pathwar, Gandapoorwal, Dalwal.

The village of Dalwal is situated on an eminence; and is the Jagire of Mishar Beleeram. It contains six hundred houses and ten shops. It was formerly included in the district of Janjooa. The Mishar has built here a fine-upper storied house for his own accommodation. There are eight wells for cultivation. In the road is the village of Badshapoor, the former chief of which place was Sher Khan.

The village of Sardee is situated on an eminence, and contains one hundred houses, under a chief, Abdulla Khan, by tribe an Awan. To the east is the fort of Dharee, built by Sardar Haree Singh, and used as a state prison. It is built on an eminence, and is very difficult of approach. Mahmood Khan Hazarah Wala died a prisoner in this fort, from starvation: his sole food for twenty-four hours, being half pao flour, and the same quantity of salt. From Pind Dadan Khan to Sardee is about forty-five kos.

I passed one month in visiting these mines, and spent a good deal of money in trinkets, distributed to the head men of the different places. I also practised with success, in my profession of Hakeem; sometimes giving medicines, sometimes charms.

The village of Kahar is situated in the plain, and contains three hundred houses, and four shops; also four water mills, a fine stream, numerous trees, and the shrine of Shekh Buzurg. I have not seen a prettier place in the whole of Patwar, than this. There is a tank at the shrine, in and round which are to be seen numerous ducks and peacocks. The head man is Fatteh Khan, an Awan by tribe. The distance from Sardee to Kahar is four kos.

29th Shaban.—Proceeded six kos to Bherpoor, a place containing three hundred houses and no shops. The cultivation depends on the rain. The head men are Moghal and Samad,

by tribe Awans. To the East is Kahar, to the West Thalla, to the North Pind Malik Amanat, and to the South the hills. Revenue 1,200 rupees.

1st Ramzan.—Travelled seven kos to Thalla, the jagire of Thanah Singh Malwee. The Thanedar is Danya Singh. The garrison is composed of forty Sepoys. It contains three thousand houses, one hundred and twenty shops, and thirty wells for cultivation: thirty-two villages are dependent on this place. The head men are Haiyat Khan and Mehr Khan, by tribe Awans. To the West is Thaman, to the North Awankaree, and to the South the hills. The revenue is 60,000 rupees.

2nd Ramzan.—Proceeded to Thaman, the jagire of Ram Singh of Bhakapoor, who is by tribe a Brahmin. There are one thousand houses, fifteen shops, and twenty wells for cultivation: two kos on the road is the village of Akowar. The head men are Mahammed Khan and Budha Khan. Three kos further on, is the village of Kufree. Thence three kos is the village of Sankowalee. Thence two kos is Thaman. On arriving, I was taken violently ill. To the West is the river Sawan, to the North the districts of Gheb and Dhannee, and to the South the road to Baghan [Karabagh]. The revenue is 24,000 rupees.

3rd Ramzan.—Travelled six kos to Tarapa, on which eight other villages are dependent. There are four hundred houses, on an eminence, on the bank of the river Sawan. On the road are the villages of Koulee, Battan and Shah Mahammad Walee under Allaiyar Khan, by tribe a Sapkal. Revenue 14,000 rupees.

4th Ramzan.—Proceeded to Makhad, four kos, over a hilly road and through ravines, and two kos through a sandy defile, which is sometimes flooded, and thus impassable for a time. The road is infested by Khatak robbers, who come from the other side of the river. There are seven Mouzas, dependent on Makhad, the revenue of which is 10,000 rupees; and that of the village, custom-house, &c. the same sums. Of this Abdulla Khan receives eight hundred as pay. The houses are on an eminence overlooking the river Indus, and amount to three thousand. There are two hundred Hindoo's shops, and three gates to the village.

On arriving at Makhad, two men of Rajah Suchet Singh's came to demand two boats for crossing the troops,—in which, towards evening, I embarked with them. Gouhar Singh, of Pind Malik Amanat, with forty sepoy, kept guard on one of the gates of Makhud. The head man is Abdulla Khan, an Afghan, of the tribe of Saghuree, who can muster four thousand fighting men.

5th Ramzan.—Proceeded by water to Karabagh, which consists of a

Karabagh. fort and a suburb, situated at the foot of the salt range.

There are three thousand houses and three bazars, containing one hundred shops. On the hills are two towers, which command the town, under Allaiyar Khan. The revenue derived from the salt is appropriated by Rajah Suchet Singh. There are twelve

Saltpetre. saltpetre manufactories, the amount of the revenue from which is 12,000 rupees; which is given in jagire

to Malik Allaiyar Khan, by tribe a Satkal Awan. He could collect one thousand five hundred fighting men. They are friends with the men of Teeree and Sagharee, and enemies of the Khataks. To the East is Saeewal, to the West Eesakhel, to the North Shakar Darra, and to the South the river Indus. The revenue paid to the Sikhs is 5000 rupees, ten horses, and twenty camels. Rajah Suchet Sing's force had proceeded

Revenue. to Katkee, a fort of Ahmad Khan, situated in a valley.

The Khan, on hearing of the advance of the Sikh force, fled, and sought refuge in Bannoo Daman. The Rajah, finding the place vacated, returned, and took possession of the fort of Eesakhel.

I intended proceeding hence by water to Dera Ismail Khan, and thence to Tak by land; the Meerza became aware of this intention, and not liking to accompany me, left at night, and proceeded,

Meerza deserts. I supposed, via Shakar Darra and Cohaut, to his home at Peshawar. I was much annoyed and dis-

tressed at his disappearance, until I was fortunate in procuring another writer, an Afghan, in whose company I marched, with the Sikh force, towards Dera Ismail Khan. I remained three days at Karabagh, alias Baghan. During this time news reached the Rajah, that Alladad Khan, the son of Sarwar Khan, joined by the Wazeerees, had advanced on Tak; and that the Sikh garrison, leaving the fort, prepared for the

Insurrection. attack, which proved successful, and the Sikhs suffered a signal defeat. The town was taken and

plundered, and finally evacuated, as the people of Tak would afford no assistance to Alladad Khan and his Wazeeree allies. On receiving the intelligence, Rajah Suchet Singh, instead of proceeding to Bannoo Daman after Ahmad Khan, turned off to Tak, having sent for the two guns he had left at Karabagh. On arriving within one march of Tak, the Rajah received confirmation of Alladad Khan having retired to the Wazeerees: he therefore fell back on Eesakhel.

9th Ramzan.—Reached Eesakhel, which is the name of a district ; the village being called Zakokhel. It has a fort and sevepty shops. The tribe could collect three thousand fighting men. The cultivation is carried on from the river. The chief is Ahmad Khan. To the east is the river Indus, to the west the Murwats, to the North Karabagh, and to the South Khusoor. They are friends with the Sawan Wazeerees. The revenue is 30,000 rupees.

10th Ramzan.—Proceeded to Umarkhel on the road past Bandah Umarkhel. Saiyadan,—a collection of wooden and thatched houses.

At one kos beyond this, the Kuram river falls into the Indus. I Kuram River. forded the former, which in some places is knee, and in others waist deep. On the other side of the river is a quick-sand; on one side are the hills and the road to Kot-i-kafiree, which is so narrow, that only one horseman can pass at a time. The Sikh force and guns were at Kot-i-kafiree.

An Afghan chief, by name Shah Walee Khan, a Nyaze, was accompanying the Rajah: he was a brave man, and had performed good service. Suchet Singh however, got suspicious and afraid of him, and under pretence of getting him to look out for a gun road, sent him with a party of Sikhs, who, in compliance with their secret orders, murdered him on the road, as he was saying prayers, having dismounted for a time for that purpose. The Rajah then set out for Tak, by the Kuram valley. News was brought that the Khan had been killed by the Afghan Ghazees, who were in rebellion against the Sikhs, and prowling about. The Rajah, in great apparent distress at the intelligence, ordered the body immediately to be sent for, and buried. There are two forts at Kot-i-kafiree, both in ruins; one below, and one on the hill: from one kos beyond the hill, Umarkot becomes visible. The place consists of about a hundred houses, and two Hindoo

shops, situated beneath a hill. To the West is Dera Ismail Khan, to the East Eesakhel, to the North hills, and to the South the river Indus.

11th Ramzan.—Proceeded seven kos to Khusoor, a place inhabited by Afghans, who muster one thousand fighting men, under Hassan Khan, by tribe a Khusoor. There are five hundred houses, and eight shops. The cultivation depends partly on the rain, and partly on the river. To the West are the hills, to the East the river Indus, to the North Eesakhel, and to the South Baloot-i-Hazrat-i-Shah Eesa. The revenue of Khusoor amounts to eight thousand rupees. The inhabitants are friends with the Murwats, and enemies of the Eesakhel. Two kos from Umarkhel is the shrine of Shah Baloot, the road to which place is through jungle, abounding with date trees. There is a gun road along the river. At the shrine there are many fine trees, and a tank, stocked with duck.

12th Ramzan.—Proceeded to Dera Ismail Khan, which place need not be described by me, as it was visited by Capt. Burnes, on his voyage up the Indus. I here met a servant of his proceeding to Bombay, in charge of a flock of sheep.

13th Ramzan.—Proceeded four kos to Bandah-i-Saiyadan, over good level ground.

14th Ramzan.—Travelled six kos to Kot, over a good level road without water.

15th Ramzan.—Proceeded seven kos to Mandye; sometimes over a level road, and at times over rising ground. The amount of fighting men in the neighbourhood is two thousand, under Gul Khan and Jahan Khan. There are seven hundred houses and fifty shops. The revenue is included in Karachee. To the west are the Suryanees, to the East Dera Ismail Khan, to the North the Murwats, and to the South the Myankhels. The inhabitants are Gandapoors, of the tribe Barakhel, who are enemies of the Suryanees. On arriving, I introduced myself to Jahan Khan. In the course of conversation, he expressed his desire to procure some white "kushtah" of copper. This I showed him how to make, much to his delight, and he gave my companions three coarse shalakees, one piece of karbas, one maund of raisins and jalghozas, and two seers of Candahar tobacco; which latter was a most acceptable present.

19th Ramzan.—Travelled six kos to Karachee, a place inhabited by Barakhels, amounting to six thousand fighting men. The place Karachee. contains one thousand and five hundred houses and two hundred shops. There is a large grain exchange on Mandye here. There is a wall one and a half *guz* and high, round Karachee, through which there are numerous thoroughfares. There is a large tower in the town. The cultivation depends on the rain. The inhabitants are at enmity with the Suryanees, and reciprocal forays are constantly carried on. To the south toward the hills, are the Shekhans and Zarganees, and two hundred houses of fakeers, where the cultivation is carried on with running water. The headmen of Karachee are Alee Khan and Gul Mahammad Khan. To the east is Dera Ismail Khan, to the south the Myankhels, to the north Usturana, and to the west the hills. The revenue under the Sikhs is thirty thousand rupees. During my stay, the Sikhs wanted to increase it to 50,000 rupees. The above two headmen proceeded to Lahore, to lay a protest before the Maharajah. Two rupees a load is levied here from each merchant's camel. I had a letter of introduction to Alee Khan, from his younger brother Jahan Khan of Mandye. On my arrival at Karachee, Alee Khan came to see me, and treated me with great respect. After my interview with him was over, I took up my quarters in the mosque, where I tried to settle myself to sleep, not feeling inclined to eat from excessive fatigue. While my companions were satisfying their hunger, and I was yet awake, a man and woman presented themselves at the mosque door, wishing to see the fakeer that had arrived. On enquiring the cause of this untimely visit, the man informed me he had a young wife at home, possessed of a devil, which he entreated me to cast out. I promised to do all I could in the morning; they went home, and returned with an entertainment of bread, ghee and curroot. In the morning, the "Pesh Nimaz," or clerk and the people came to the mosque to prayers; I was kicked up out of my sleep, to join them. I arose, and made my ablutions; but not knowing the proper positions for the Sunnee ritual, I was very nervous. Prayers. I however got through the ceremony, by copying faithfully the man who stood next me. After prayers, I was taken by my friend of the preceding night to his house, to cast out the devil. By this

time I had become known in the village, and the people came to me in crowds, especially women, some begging for charms to increase the attention of their husbands, others for charms to get them husbands; upon others I spat, at their request, to cure cutaneous diseases. Towards evening, they brought me the woman possessed of the devil, whom I proceeded to cure, [God pardon me,] in the following manner: Wrapping

up some of the detonating powder in a paper, I gave
Casting out a Devil.

it to my servant to keep; then sending for the woman, and wrapping up in a piece of paper a small quantity of ashes in the presence of the people assembled, I gave it to my servant to give her, that she might deposit it in an old grave-yard for the night. I had of course before given orders to my man, to give the woman the detonating powder, instead of the ashes. The woman implicitly followed the instructions, and next morning returned with the paper, accompanied as usual, by many people. I then ordered the woman to place the ashes on a stone, and putting a rod of iron into her hand, directed her to watch a sign from me for striking the ashes: I then commenced vehement incantations, becoming very excited at times, until at the given signal, the ashes were struck, and a loud report, as of a matchlock, succeeded, when I ended by exclaiming, "I have shot the devil; now you are cured." The populace were astounded, and loaded me with their attentions. I remained three days at Karachee, and on my departure, presented the woman with a looking-glass I had purchased for two rupees, telling her to look at herself in it, whenever the devil felt again inclined to return. To the east of Karachee is Dera Ismail Khan, to the west the hills, to the north Usturana, and to the south Tak.

23rd Ramzan.—Proceeded seven kos to Rohree, a place containing eight hundred houses and three Hindoo shops. The
Rohree. fighting men amount to one thousand. The cultivation is carried on with running water. To the east is Dera Ismail Khan, to the west the Hills, to the north Karachee, and to the south Tak. The headman is Mahammad Raheem Khan, by tribe a Barakhel. The inhabitants are enemies of the Suryanees. The houses are in a fort, and the ruler distributes justice on a low platform outside. On arriving, he refused me entrance, and I put up at a running stream near at hand, and having cooked a pillau, invited the

governor to join us: upon this he insisted on my occupying a seat near him and partook of the fare, and in the evening sent me a "*lyaf*" or coverlid; under which, owing to its inhabitants, I got no rest.

24th Ramzan.—Proceeded nine kos to Tak. The chief Alladad

Tak.

Khan, who was then an exile, is by tribe a Doulatkbel. In his late incursion, he burnt all the neighbouring villages.

At Tak [i-Sarwar Khan] I found the following Sikh force; viz. Jemedar Mahommed Hashan, and one hundred sowars, and five zambooraks. Chet Singh Kumedan with a like detachment. Lena Singh, with one hundred ghorahchars. Saidar Ram Sing, with a like number, one hundred other ghorahchars, dispersed in small bodies; six hundred infantry of the regiment of Futteh Singh Aloowala, one gun. Nadir Alee Khan, Baloch Khan, and Mayan Khan, with forty horse, besides other footmen.

There is a smaller fort within the fort of Tak, called Narinj Kilah,

Citadel.

within which there are three wells: and inside the outer fort gate are seven guns and twenty-five zambooraks, all manned. Guns can be mounted on all the four bastions of the Narinj Kilah, to receive which, there are "*damdamas*." The breadth of the wall is four *guz*. There is an "*alampana*" or *fausse braie*, and a ditch, nine *guz* broad. There are two gates to the Narinj, one to the east near a garden, another to the west. There are seven gates to the

Gates.

outer fort, called respectively, Nourang, Peer Dastgeer, Hazrat Eesa, Sarbanan, Mooree, Panch Tanpak, and Maranee. The fort is surrounded by gardens, around which again there is a wall having three gates. Three sides of the fort are surrounded by broken inaccessible ground. The only good approach is from the direction of Dera Ismail Khan. The Doulatkhels amount to two thousand fighting men, and are enemies of the Wazeerees. In the whole country of the Doulatkhels, there are two running streams; one called Tak, the other Kamal. To the east is Dera Ismail Khan, to the west Daraban, to the north the Myanees and Wazeerees, and to the south the Gandapoors. The road from this to Cabool is almost impassable, from fear of the Wuzeeree plunderers; the general road taken by the

Road to Cabool.

Luhanee and other merchants, is from Daraban. The cultivation is carried on by running streams. The

revenue in the time of Sarwar Khan, was 23,000 rupees. The produce no doubt amounted to 200,000. It now costs Value to the Sikhs. the Sikhs more than it is worth.

The fort of Fattedgur is dependent on Tak, and is a very strong place, situated on an eminence. It belonged to Alladad Fattedgur. Khan, who entrusted the command to Anayatulla Khan, one of his most trustworthy men. On the Sikhs gaining possession of Tak, this man surrendered his trust to them, and was again installed in the command. The fort is situated to the west of Tak, at the entrance of a valley. The inhabitants of the neighbourhood are Myanees. The fort is surrounded by a *fausse braye* and a ditch, nine *guz* wide; two of the bastions are fitted for bearing guns. There are two wells inside. The inhabitants do not amount to more than two hundred. To the east is Tak, to the west the Myanees, to the north the Gandapoors, and to the south the fort of Thattee.

5th Shawal.—Travelled six kos to Mameer, a place containing twenty-five houses, situated at the base of a hill. Mameer. The inhabitants are all robbers. It is a dependency of Tak. These people act as guides to the Myanee and Wazeeree robbers, who make excursions into the Tak territory, and receive a share of the plunder. As the main road to Shinkee was impassable, being infested by thieves, I determined on going in company with my new Persian writer, a man of Alladad Khan's, and a guide procured from Mameer, by a hill bye-road to Bandah-i-Saiyadan, where I arrived

on the 6th Shawal.—There is a shrine here of Shekh Bandah-i-Saiyadan Kalamkar, and the Wazeerees bring offerings of wheat, and heap it on the ground, and no thief is bold enough to steal any of it. The Sayad alone, in times of scarcity, when they cannot procure it

elsewhere, make indents on the store. The road is Sacred Granary. hilly, and for some distance through a defile. There are fifty houses of Sayads. On arriving, I put up in the mosque, where one of the Sayads brought a son of his to be cured of a cataract in the eye. This I promised to do, if he would allow his son to accompany me to Shingee, which he did. The length of the stage was seven kos.

7th Shawal.—Proceeded six kos to Chandoulah, over hills through defiles, and crossing a stream that flows from Kanee-guram to Tak, at least twenty times. The place is Chandoulah.

situated at the entrance of the Wazeeree valley, and contains about one hundred houses. I took up my quarters in the mosque as usual; my writer had an acquaintance here who entertained us. The hills abound with iron, that the people work and take to Kot-i-Singee.

8th Shawal.—Set out with the intention of proceeding to Aleekhel. The road was through jungle, defiles, and over hills. On arriving at a stream I halted, and made preparations for cooking, when a party of six men, apparently robbers, presented themselves, and partook of the fare, and smoked our *chiltums*. They then questioned us as to our homes, and the object of our journey. I replied, that we had come from Mecca, and were proceeding home to Baghdad. They then asked what we had with us. I replied we were poor Hajeess, and had nothing but a few medicines. These they requested to see. On my complying with their request, the English writing on the packets attracted their attention, and demanded

Discovery.

what the strange character was. I replied that they were marks of my own invention, and mere help to my memory, marking the different medicines. They became suspicious, and opening my bundle, extracted the articles that pleased them most, such as penknives and scissors. They then bound us and took us to Khel-i-Masaoood, beating us all the way, and on our arrival, sent for the village Akhund and shewed him the inscriptions. He immediately decided that we were Feringees, in which opinion the Akhund confirmed them also, on reading the notes of the road my Persian writer had. We were very badly treated during our captivity, which lasted twelve days, and were

Captivity.

daily threatened with death. They endeavoured to make my companions give evidence against me, by beating them apart, and promising them freedom if they would confess. During their punishment, they would allow I was a Feringee, but when it ceased, declared only I was a fakeer. When we were alone, I warned my companions not to peach, as we should certainly all be killed. A man of Kheli Masdood went one day on an errand to Kot-i-Singee, the head-man of which place was Dilasa Khan, who on enquiring the news, was informed, that some Feringees had been discovered and confined in his village, and they were thinking of killing them. Dilasa Khan being a great friend of the late Mr. Moorcroft, on hearing this, immedi-

ately set out, and arrived where we were confined,

Mr. Moorcroft.

and had us released, and our property restored; and taking us with him seven kos to Kot-i-Singee, entertained us three days, killing a sheep for us every day. Here we

Release.

witnessed a peculiarity in Wazeeree hospitality. The sheep, when

Hospitality.

killed, is brought with all its eatable appurtenances and placed before the guest, the villagers assemble round, and every one helps himself to the pieces he likes, which are "kababed" [the breast always,] and the rest is put in a pot to boil. It was the 21st Shawal when I arrived at Kot-i-Singee. The num-

Kot-i-Singhee.

ber of fighting men is six thousand, who acknowledge no rule. The headman is Dilasa Khan, by tribe a Massaoodkhel Singee Wazeeree. To the east is the Gholaree Pass, to the west the hill, to the north Kaneeguram, and to the south Tak. There are nine blacksmith's shops, and three of Hindoos. There is a mud fort, containing four hundred mud houses and woollen tents. Dilassa Khan entrusted me with a letter to Capt. Burnes, and furnished me with a guide to Cohaut, who ran away after having accompanied me three kos. The inhabitants are enemies of the Tak people. Dilasa Khan is suspected, not without reason, of being in the pay of the Sikhs. During my stay, he pointed out an eminence on which Mr. Moorcroft promised to build a fort for him. The kindness he experienced from the above gentleman, would at any time incline him to serve the British Government.

25th Shawal.—Proceeded seven kos to Kot-i-Aleekhel, passing

Kot-i-Alee Khel.

often through water and jungle, and a Pass, which extends to Kaneeguram. The Aleekhels muster four thousand fighting men. To the east is Thattee, to the west Bamroo, to the north the Ahmadzyes, and to the south the Myanees. I put up in the mosque very tired; scarcely an hour had elapsed when a man presented himself, saying his son had a bad ball wound, and wanted me to attend him. Being tired and wanting a guide, I told him I had not now the requisite apparatus, but if he would send some men in charge of his son on with me to the next town, I would try my best. To this the man would not consent, and took his leave. The road

Iron.

was very bad, and everywhere were veins of iron, and signs of where it was being, or had been, worked.



26th Shawal.—Arrived at Kaneeguram, which is the capital of the Kaneeguram. Wuzeeree country. The cultivation is carried on by running streams. The inhabitants are Sayads, who are the spiritual fathers of the Wuzeerees. The houses are upper-storied, and amount to four hundred. There are two large towers for the protection of the town. There are thirty-two shops, as follow; viz. sixteen of Hindoos, seven blacksmiths and cutlers, three goldsmiths, two scabbard makers, and four dyers. The headmen are Durvesh Khan, Sarwar Khan, Mulook Khan, Abdukahman Khan, Raim Khan, and Noor Khan. The amount of fighting men is five hundred. The Sayads are farmers; the Wazeerees are independent, and are mostly herdsmen. They are at enmity with the neighbouring tribes, but internally united. To the east are the Khataks, to the west the Gholaree Pass, to the north Dour, and to the south Tak. The cultivation is not at all proportionate to the supply of water; the stream River. that runs to Tak has its rise here. To the west, in the Pass, is a very lofty and extensive black mountain, called Peer Karal, in Peer karal. which I was informed copper is to be found. Disputes between the neighbouring chiefs led to the mines of this mineral being closed. The people also believe in the existence here of stones impregnated with gold. I much wished to visit this mountain, but was prevented by the cold, and want of a guide. Throughout the hills iron abounds, and there must be no less than fifty or sixty manufactories. The price of unwrought iron is 3 rupees Mehrabee the pukka maund. In Tak the Wuzeerees sell the quantity for Price of Iron. 4 and $4\frac{1}{4}$ rupees. Merchants purchase it from the Wuzeerees for $2\frac{3}{4}$ and 3 rupees. Beyond the Peer Karal hill, coal is Coal. found, which is called "Sang-i-momyie." The method of extracting the iron is as follows: A pit is dug, about three and half Iron. feet in diameter, and the same in depth, the top of which is closed with a perforated cover of clay: over this is spread a coat of charcoal, which is made in great quantities in the neighbouring hills; over this the stones containing the iron are heaped, being first broken small, and over them again charcoal is heaped; round this heap five or six bellows are applied. The iron falls through the perforated cover into the pit, from which it is extracted to be wrought before being sold. The iron in being wrought, loses three-quarters and five-eighths

of its weight. This process is alone undertaken by blacksmiths. The Wazeerees are divided into four classes; viz. Masaoodyes, Ahmadzyes, Aleezyes, Bahlolzyes. The headmen of the Ahmadzyes are Bano Khan, Shekh Bayo Khan, Painsa Khan, Neko Khan, Kazim Khan, and Pasham Khan. The fighting men amount to four thousand. To the east they have the Khattaks, to the west the Masaoodyes, to the north Khoist and the Torees, and to the south Bannoo. The headmen of the Aleezyes are Aleezyes. Mahommed Asan Khan, Durvesh Khan, Sarfraz Khan, Mahommed Khan, Sayad Shah, Mulla Ghaib Khan, Khudadad Khan, Tooran Khan, Wilayat Khan, Sarwar Khan, and Hatim Khan. They muster from four thousand to four thousand and five hundred fighting men. To the east they have Thattee, to the west Bannoo, to the north the Ahmadzyes, and to the south the Myanees.

The headmen of the Bahlolzyes are Nasrat Khan, Sair Khan, Bahlolzyes. Salamat Khan, Deerut Khan, Bazzul Khan, Alee Mahommed Khan, Mulla Nadir Khan, Meer Allam Khan, Dost Khan and Gul Rez Khan. They mustered three thousand and five hundred fighting men. To the east they have the Admadzyes, to the west Kaneeguram, to the north Dour, and to the south Thattee.

29th Shawal.—Proceeded nine kos to Manzakee, over a hilly road, through a jungle. It is situated between two streams, and consists of forty houses; beyond the stream to the south, are other thirty houses. There is a water mill in play. The headman is Mushkeen Khan, by tribe a Shahookhel. Number of fighting men one hundred. They are at enmity with the people of Dour. I put up on arriving in a blacksmith's shop.

1st Zeekadah.—Travelled seven kos to Kamsar over a hilly road, and through a jungle. On descending from one of these hills, I stopped for a short time on the borders of a stream, with the intention of taking some refreshment, when I observed a party of four men advancing towards me; fearing they might be thieves, I had recourse to my detonating powder, and placing some on a stone at my feet, awaited their approach, when they drew near, in attempting to rise, I rested my walking stick on the powder, exclaiming "Ya Allee mad-dat," (help! oh Allee.) The usual explosion ensued, and the Thieves. thieves, for such I still suspect them to have been, ap-



proached me with great reverence, and requested that I would bless them by clapping them on the back. The head man of Kamsar is Noor Khan. The number of fighting men is eighty. They are at enmity with the people of Dour. The place is surrounded by hills, and is itself situated on an eminence. There are three Hindoo shops. On arriving I put up at the *mehman khanah*, and introduced myself. They brought a bed for me, on which I seated myself. They then asked me if I had dined, I replied that I had now entered their country, (a hint that I depended on their hospitality,) one of them immediately rose, and brought some rice and butter milk. While I was dining, a Hindoo presented himself, and complained that he had a wife, who had presented him with three children, but was dumb; I suggested, that she must

Dumb Woman.

be possessed of a devil. He insisted on my accompanying him home. This I did, saying that I would

put a copper pice and a rupee into a vessel of water, and that one or the other would leap out; if the former, he must distribute a fowl and some copper change in charity; if the latter, a sheep. A vessel being produced, I proceeded, with the aid of my servant, to discolour the

Jugglery.

water, in order to conceal the contents which consisted of a steel spring, confined by means of a piece of rock salt, on which I placed the rupee during my incantations. The salt of course in time melted, and the spring expanding, jerked the rupee out of the water. The sheep was accordingly given me to sacrifice, as well as the charmed rupee; and in return, I gave the dumb lady a looking glass, in which she was punctually to look at herself, whenever threatened with a return of the dumb devil, which I assured them would either quit her after seven days, or seven weeks.

3rd Zeekadah.—Proceeded to the valley of Dour, which is embosomed

in hills. The cultivation is carried on by running streams.

Dour.

There are about one hundred, or one hundred and fifty different forts and villages in the valley. Three of the forts are large, the residences of the Malik. They are Thattee, Ismailkhel, and Hyderkhel.

The headman of Thattee is Mahommed Khan, by tribe a Khattak.

Thattee. There are six hundred houses, and sixty-five Hindoo shops.

The number of fighting men is one thousand. They are at enmity with the Wazeerees. To the east are the Hasankhels, to

the west, the Utmanzyes, to the north Khost, and to the south the Wazeerees.

The headman of the Moosakhels is Alee Khan. The fort of Moosakhel and suburb contain seven hundred houses, and one hundred Hindoo shops. From Thattee to Moosakhel is five kos. The number of fighting men is three thousand. They are at enmity with the Wazeerees. To the east are the Hasankhels, to the west the Utmanzyes, to the north Khost, and to the south the Wazeerees.

The headman of the Hyderkhels is Kamal Khan. The town of Hyderkhel contains three hundred houses, and thirty-five Hindoo shops. The country between Moosakhel and Hyderkhel is particularly fertile and well watered. The distance is six kos. There are two Sayads here, who are much looked up to. They are Furmals of Kaneeguram; their names are Jawaher Shah and Ghareeb Shah. All disputes are settled in their presence, and they draw no contemptible revenue from the district. In every field in the valley, there is a tower built for its defence. They are much divided among themselves. The fighting men amount to two thousand. They are friends with the men of Khost and Bannoo, and enemies of the Wazeerees.

There is a peculiar tribe in the hills of Dour, that shave one eye-brow, one mustache, and half the beard; and apply antimony with the finger above and below the eye, so as perfectly to disfigure their faces. The men of Dour assemble once a week, at an entertainment got up by subscription: every one attended by his catamite boy, and during the repast, the most disgusting attentions are paid to them, and most revolting caresses received from them. To the east are the Hasankhels, to the west the Utmanzyes, to the north Khost, and to the south the Wazeerees. The people of Dour are perfectly independent. The distance from Moosakhel is six kos.

20th Zeekadah.—Proceeded eight kos to Usmankhel, which is a dependency of Khost. The inhabitants who are robbers, live in hair tents, which are thirty in number. They pay no revenue. They are migratory. The road to this place is difficult and hilly.

21st Zeekadah.—Proceeded twelve kos to Khost, having procured Khost. a guide over a difficult hilly road. The cultivation is carried on by running streams; but on account of the unquiet state of the neighbourhood, half the land is waste. There are three hundred and fifty houses, and thirty-five shops. The headman is Sahibzadah Ahmed Shah, [a holy character,] a descendant of Peer Holy Character. Dastgee, Shakar Khan, Nooradeen Khan, Ismail Khan and Abdulla Khan. The fighting men amount to five thousand. They are at enmity with the Wazeerees. They are ryots of Dost Mahomed Khan of Cabool. To the east are the Wazeerees, to the west the hills and the Jadrans, to the north the Toorees and the road to Kuram, and to the south the Thattee hills. The revenue amounts to 30,000 rupees, of this sum 5,000 rupees are distributed to the Maliks, the remainder is given in jaghire to Alladad Khan, the son of Sarwar Khan of Tak, who sought refuge at Cabool, on losing his possessions; and to whose son, Dost Mahommed gave a daughter in marriage. I presented the Sahibzadah with a penknife and a pair of scissors, and he in return furnished me with a guide.

25th Zeekadah.—Return to Usmankhel, and retracing my steps via Hyderkhel, on the 27th Zeekadah arrived at a town on the boundary of Bannoo, the headman of which place is Dilasa Khan, surnamed the Ghazee.

The district of Bannoo is flat, and fertilized by running streams, partly from one which comes from Dour, and partly from the Bannoo. Kuram river. The district is highly cultivated. There are full four hundred, if not five hundred forts and villages in the district. The district is divided into four tappas, or rather five; viz. Eesakee, Meereee, Suryanee, Khamsee, and Chandookhel.

The headman of Eesakee is Dakas Khan, and it is again subdivided into four tappas. The fighting men amount to four thousand. Eesakee. The revenue amounts to 22,500 rupees. The four tappas are Longarkhel, under Dakas Khan; Nukradeenkhel, ditto ditto; Siknadarkhel, ditto ditto; and Shamseekhel, under Kalandar Khan, who resides at Kalandarkhel. Dakas Khan resides at Bazar, which is the Bazar. capital of Bannoo. It contains five hundred houses, and eighty Hindoo shops, five dyers, and five blacksmiths. This place is

called Bazar, because all the inhabitants of Bannoo come here to market.

The headman of Meeree is Meer Baz Khan. It is sub-divided Meeree. into six tappas. The fighting men amount to 3,000, and the revenue to 30,000 rupees. The six tappas are:—

Kakee, under Shahbaz Khan; Obad, ditto ditto; Hasankhel and Mamookhel, under Hyder Khan; Naswarkhel under Ghazee Khan and Ameer Khan; Sarkee under Meer Baz Khan; and Mandyoo under Alam Khan.

The headmen of Suryanee is Dilasa Khan Ghazee. It is sub-divided Suryanee. into five tappas. The fighting men amount to three thousand, and the revenue to 25,000 rupees.

The five tappas are:—

Daood Shah, under Dilasa Khan Ghazee; Mandahkhel, under Bazeed Khan and Meer Kalam Khan; Walakdeenkhel, under Zapt Khan; Ghazeekhel, under Zahar Khan; and Hek-mis-kee, under Sekandar Khan.

The headmen of Shamsee are Jangee Khan, Meerash Khan, and Jafar Khan. The fighting men amount to two thousand, Shamsee. and the revenue to 22,500 rupees. It is sub-divided into four and half tappas, as follow:—

Barkhajaree-Sarkhajaree, under Janghee Khan and Jafar Khan; Ismailkhel and Meerakhel, under Sirdar Khidr Khan; Waleekhel and Sikandarkhel, under Meer Wais Khan; and Daree-Deeree, under Namwar Khan and Gada Khan.

The half tappa Meetakhel and Fattehhkhel, under Sirdar Ameer Khan. The chief of the Chandookhelan is Sirdar Sher Mast Khan, noted Chandookhelan. throughout Bannoo for his hospitality. Ahmed Khan, Refuge, the ex-chief of the Eesakhels, has sought refuge here. Dakas Khan is, however, the chief of the greatest note in Bannoo. The number of fighting men is four thousand. This district is much deserted, on account of the Sikhs levying three-sixteenths of the produce as revenue.

The cultivation of the district consists of turmeric, sugar-cane, rice, cotton, wheat, barley, and juwaree

The inhabitants of Bannoo, denominated Bannoowals, are friends with the people of Dour, and enemies of the Wazeerees. They have

also, to a great extent, feuds among themselves; and are ryots of Runjeet Singh, but very unsteady ones; and their revenue is generally collected by large detachments. To the east and north are the Khattaks, to the west the Wazeerees and Dour, and to the south the Murwats.

I remained on the boundary of Bannoo two days, and at Chandookhel three days; the distance between the places being five kos.

2nd Zeehijjah.—From Zakookhel Chandookhelan, proceeded eight kos to Umarkhel, a dependency of Murwat, over a sandy road, with the exception of the two first kos. The place contains thirty mat huts; their drinking water is two kos distant. The cultivation depends on rain. Each house subscribes a vessel for the mosque and for strangers.

3rd Zeehijjah.—Proceeded to Murwat to the village of Lakkee. Lakkee. The cultivation depends on the rain. This is the principal town of Murwat. A small portion of the Kuram river is applied to cultivation. There are three tribes of Murwats.

Bahram, under Feroz Khan and Muhablat Khan, resident of Ghuznee-Bahram. khel; amount of fighting men two thousand.

Dreplarah, under Noora Khan and Allaiyar Khan, resident of Sangookhel and Asakkhel; amount of fighting men two thousand.

Moosakhel, under Hyder Khan, resident of Adamzye, and Cashmeer Khan, resident of Walee; amount of fighting men one thousand and five hundred.

The former amount of the revenue of Murwat, in the time of the Revenue. Sadozyes, was 18,000 rupees, and in the time of the Nawabs of Dera, 50,000 rupees.

The town of Lakkee is situated in the division of Bahram; but the Lakkee. whole three divisions dispute about their claims to it. The Maliks of Lakkee are four in number; viz. Deewana Khan, Gouhar Khan, Jahan Khan, and Alam Khan. The town of Lakkee is composed of four hundred houses and twenty shops, three dyers, and two blacksmiths. They are now ryots of Runjeet Singh, but compulsory ones, and their revenue is only collected by detachments of Sikh troops. They are friends of the Bannoowals, and enemies of the Wazeerees.

Proceeded on leaving Lakkee to Lachee Teeree, a dependency of Lachee Teeree. Cohaut, under the rule of Runjeet Singh, a jaghire

of Sultain Mahommed Khan Barikzye. There are only four salt mines in the whole Khattak country: two in the district of Lachee, called Malgeen and Cheena, and two in that of Teeree; the salt from the latter is black and mixed with small pebbles. That of the Lachee mines is of a superior quality. The district of Lachee is farmed by Saidan Shah, for 22,000 rupees. In the district are included the mines, Ismailkhel, Meer Ahmadkhel, and Malgeen. The pay of Saidan Shah is five thousand rupees, and his jaghire is in Cohaut in the district of Sher Khan. He has in his employ twenty horsemen.

The mines of Chotara are known by the name of Maheekhel and Karz Kurooz, and are farmed by Shahbaz Khan, Akarkhel of Teeree, the capital of the Khattak country.

The price of salt in Teeree and Chotara is twelve ass loads, or eight bullock loads for one rupee of the Sultan Mahommed Khan's coinage; ten pice is levied on every bullock load, and eight pice on an ass load; one pice the load is levied by the miner.

One-fourth of the government duties on Lachee salt is given in pay to Maliks Nadir and Bahadur, who superintend the whole districts of Khurm and Thattee. In the winter, Afghan merchants export thousands of camel loads of this salt to Cabool, Jelalabad, Peshawur, and Bajour.

The salt of Chotara is exported only to Bunoo, Khost, Murwat, and the Derajat.

The fighting men of Lachee amount to three thousand. Two kos from Lachee are three hillocks of yellow earth, in which are flat flakes of stone, which burn. There are also two springs of naphtha.

Teeree, which is the capital of the Khattak country, has a fort with four bastions, which is situated on an eminence. It was repaired by Sirdar Attar Singh Aloowalya, who conquered Cohaut. The whole of the district of Teeree is managed by Shahbaz Khan, son of Sadullah Khan, Akorkhel, who has farmed it from Sultan Mahommed Khan, for 30,000 rupees. His own pay being 3,000. He furnishes one hundred and ten horsemen. There are three tappas dependent on Teeree; viz. Darra Barak, Chotara, and Shakar Darra. The fighting men of Teeree amount to three thousand.

The cultivation depends on the rain, and their drinking water is from a spring, which becomes brackish soon after issuing from the Goitre. ground. The men and women here are all afflicted with the *goitre*, which they say, arises from the salt quality of the water.

The people all dress in red. They are gradually, under the rule of Shahbaz, beginning to re-inhabit the suburbs of the repaired fort, called Narinj, which contains one hundred houses; the other old fort contains one hundred and fifty.

On arriving at Teeree, I put up in the mosque, when shortly after, a very good looking woman presented herself, bringing with her bread and halwah, which she presented to me. Then taking hold of my skirt, begged me to attend to her petition. This was to give her some

Charm. charm, to attract the attentions of her husband, which had

for the past six months been divided among his other wives, to her entire exclusion. I ordered the Persian writer to make out the necessary charm, and gave it to her, as well as a piece of sugar-candy, which I charmed by wetting it with my saliva, while I repeated supposed incantations over it. This she was to give her husband to eat. Whether he was pleased with the perhaps unusual attention and fondness of manner of his wife, or how it was, I know not; but she

Success. returned to me next morning, with a present of a sheep, much pleased with the effect of my charm.

My fame for charms soon spread, and fearing that I should have hosts of female applicants, and that some of my charms might not prove so efficacious as the first, I was glad to take my departure.

On leaving Teeree, at the distance of three kos at the entrance of the Darra-i-Barak, is the ruined fort of Rajnagar, generally known as Shahbazar. It is of a square construction, situated on

Rajnagar. an eminence, and has a very large tank inside. The

position is a very strong one. Coal is found in the Darra-i-Barak in the bed of the ravine, by digging. It is brought here by

Coal. floods, and there is no bed of it. To the east of Rajnagar is

the Lachee road and the Darra-i-Barak, to the west the Darra-i-khattak, to the north the Khattaks, and to the south the Khattaks, Shakar Darra, and Baghan.

Leaving Lakkee, I proceeded seven kos to Latamar; a dependency of Chotara, over a bad road, without water. The headman is Daraz Khan.

From Latamar I proceeded seven kos to Karak, over hills and Karak. through defiles; drinking water is procured from a spring, which turns brackish at three or four paces from where it leaves the ground. The headmen are Sangee Khan, Danial, and Darab Khan. This place is pleasantly situated in a valley. On arriving, I put up as usual at the mosque, when two men, father and son, presented themselves, and requested my aid in the following matter:—

Complaint of Theft. The son had sold a cow for 20 rupees and given the money to his mother, who said it was lost, and he

wanted to know, whether his mother, sister, or wife, was the thief. I enquired if any one else had been in the house. He replied in the negative. I enquired of the mother, where she had laid the money?

Conjuring. She replied underneath the clothes. I then proceeded to arrange my conjuring apparatus of the bowl of discolored water and steel spring; and writing the names of the five members of the family each on a separate slip of paper, confined each slip to a copper pice, by a layer of dough, and placed one of the pice on the spring. This in due course of time, by the process before described, was forcibly ejected from the bowl. Taking it up, and stripping off the dough, I proceeded to read the name. Then wisely shaking my head, I said, "Now I know the thief, who shall be exposed, if the money is not restored before

Theft discovered. morning." At midnight, I was gently awoke by the complainant's wife, who confessed to the abstraction of the money, and promised to do any thing, if I would not expose her; at the same time she counted into my hands the missing 20 rupees. In the morning, when the husband came to see me, I presented him with the rupees; saying, I had the greatest trouble in recovering them from the genii who had taken them away. Some of them were pressed on my acceptance, but I refused them, in order to sustain my character; but the good people would not be content, until they had cooked and packed up two fowls for my journey, on which I was accompanied for two stages by the grateful owner of the rupees.

From Karak I proceeded five kos to Meetakhel, over salt hills. Meetakhel. The headman is Alladad Khan.

From Meetakhel I travelled six kos to Zamankhel, over salt hills
Zamankhel. of a red colour.

Thence I proceeded four kos to Kuharkhel, over salt hills and
Kuharkhel. through a jungle, and the next day six kos to Teeree.

From Teeree I proceeded five kos to Mameekhel, over a high Pass,
Mameekhel. impracticable for artillery.

Thence I proceeded seven kos to Seemaree over a hilly tract; one
Seemaree. division of this place, Seemaree-i-Paiyeen, is dependent
on Hangoo. The headman is Mazulla Khan. From this place I had
intended to visit Hango; but my funds being expended, and hearing
from Meerza Samad, the son of Meerza Abdu Raheem, who had come
to collect the revenue for his master Sultan Mahommed Khan, that a
Persian acquaintance of mine, by name Agha Mehdee Khan of Ispa-
han was at Cohaut, I determined to proceed to that place, to procure
his assistance. Meerza Samad entertained me with dancing and
wine, the evening I staid with him.

From Seemaree I proceeded six kos to Jabba, which is dependent
Jabba. on Cohaut, over a high Pass, on the top of which is a tank.
The whole of my stay in Lachee and Teeree, amounted to nine
days.

12th Zeehijjah.—Arrived at Cohaut, and proceeded to the house of
Cohaut. my acquaintance, Agha Mehdee. Here the Persian writer
became clamorous for pay. I silenced him, however, with some trou-
ble, by promising to return from Peshawur with the necessary funds,
for which place and purpose I accordingly made my arrangements for
starting.

On arriving at Peshawur, I took possession of the manuscripts I
Digression to Peshawur. had sent from Tak by the hands of my cossid,
whom I met here, and lost no time in making search
for a fresh Meerza. I at last procured one, by name Safdar Shah,
through the aid of Captain Burnes' Cafil Bashee, a resident of Peshawur;
who after a great deal of hesitation, lent me some money, and
took the security of Safdar Shah's father, that he would not desert me.

Returning from Peshawur, I arrived at eight kos at Mitanee; passing
Mitanee. Bara-i-Kalan, and the following Momand villages; viz. Ba-
hadur, Mashookhel, and Ouzye, &c. over ground abounding in ravines
and jungle.

From Mitanee I proceeded seven kos to Akhor, and put up with Malik Akhor. Hakeem Akhorwal, by tribe an Afreedee, and a great robber. The road was stony and through defile. At the entrance of the defile are two ruined forts and a large tank. There is a large town here, erected by the Afreedees. One thousand rupees are yearly levied here on salt.

From Akhor I proceeded to Cohaut over a hilly road, and through a defile; the neighbourhood abounding with Afreedee villages, and put up with Agha Mehdee in the village of Myankhel, near the shrine of Hajee Bahadur. On the road passed the village of Zarghoonkhel, where there is a large tank and four towers, one at each angle of the village, and four kos further on, passed the village of Torakee, which is situated on an eminence; and then the Cohaut kotal or Pass, which is very difficult,

especially of descent. On the top of the Pass is a tower, nominally for the protection of the road; but it is garrisoned by twelve men of the Afreedee tribe, who, although entertained and paid by the governor of Cohaut, are often themselves engaged in plundering merchants and travellers. At the bottom of the Pass is a second tower, garrisoned by twenty men. At Cohaut I discharged the former Meerza, having paid him up.

Cohaut is divided into three tappas, as follow: Bazeekhels, Samalzyes, and Meeranzyes.

Cohaut itself is included in the territory of the Bazeekhels. The fort of Cohaut, in which the governor resides, is of a square form having four bastions, and situated on an eminence. There is a second fort, in which there is a dwelling house and reception room, over which is the *mehman khanna*. There is a tower in the fort at the entrance and a covered well; drinking water is procured from seven springs outside the fort; three of the springs gush out from near the Telee's mosque, Bazar, and four from the vicinity of the Bazar, by which four mills are turned. There are fifty shops, four mosques, and two dharmshals.

Cohaut has to the east the Afreedee country, the Torakees and Soorakees, and Khushalgar, to the west Hangoo, to the north the Pass, and to the south Lachee and Dour.

The following are the neighbouring dependencies of Cohaut, entered into the daftars as Bangash-i-Paiyeen Jangal, under Shah Zaman and Aslam. The cultivation is car-

Neighbouring dependencies.

ried on by running water. There are one hundred and fifty houses. The fighting men amount to one hundred and ten. They are friends with the Sepas, and enemies of the Khattaks.

Peerkhel, under Maliks Raz and Jafar. There are one hundred Peerkhel. houses, and eighty fighting men, who are friends of the Sepas, and enemies of the Khattaks.

Garee Myankhelan, under Malik Nasarulla, contains fifty houses. Garee Myankhelan. The cultivation is conducted with spring water. In this division, the shrine of Hajee Bahadur is situated, as well as a large mosque, and a well with a Persian wheel. The fighting men amount to one hundred.

Bezadee, under Maliks Arsala and Siffat, contains one hundred Bezadee. houses, and eighteen shops, and turns out sixty fighting men.

Meer Ahmedkhel, under Malik Mahmood, contains fifty houses, and turns out thirty fighting men.

Shekhan, under Malik Sheraz, Afreedee, Zarghoonkhel, situated at Shekhan. the base of a hill, contains eighty houses; and turns out fifty fighting men.

Kaghazee and Nasratkhel, under Malik Noor. A number of other Kaghazee and Nas- villages have been deserted on account of the ty-
ratkhel. ranny of Sher Alee, the former governor. The cultivation is carried on from the river. The above two khels contain fifty houses, and turn out eighty fighting men; and are the jaghire of Ismail Khan, son of Jahandad Khan Popalzye.

Mahommedzye, the jaghire of Agha Mehdee is under Malik Bashar, Mahommedzye. and contains two hundred and fifty houses, and two water mills. The number of fighting men is 95.

I paid a visit to the famous koh or hill of Ahad-i-Saboor, so much Ahad-i-Saboor. talked of by the people of Cohaut. It is situated on the road to the Samalzyes, and beyond Mahommedzye and Nasratkhel. I had heard that there was an old inscription which no one could read, and went therefore prepared to copy it: also, that there were the ruins of an old square fort, with the remains of the stable, harem, and pillars of a throne. I went in company with a party Shah Kotah. from Cohaut to this hill, which is also known as Shah Kotal. The foot of the hill is covered with jungle. On the side of the hill is an opening or cave, and on the outside are two sta-

lactite looking pillars, the whole place evidently natural. The inscription alluded to, was nothing in my opinion but natural crevices and marks in the rock. On the hill are just perceptible, the remains of a very old fort. There is also a spring of water, and a large "peepul" tree. Adjoining this hill, is the hill of Damchoor, which extends to the Pass of Cohaut.

Bar is under Shahbaz Khan, and contains sixty houses and several vineyards. The cultivation is carried on by running water.

Kamar Dand is under Gul Sher Khan, and contains thirty houses. Kamar Dand. The cultivation depends partly on rain, and partly on running water.

Soorgal and Jabba are under Euland and Musaib, Zarghoonkhel Soorgal. Afreedees. The cultivation is carried on by water from the Kuram river. The fighting men amount to 50.

Jarma and Shapoor are dependencies of Garee Myankhel, the former Jarma and Shapoor. is nearly a waste; and the surrounding jungle is very dense.

Togh is under Mulla Ahmed and Kaim, and contains four hundred houses. The cultivation is carried on by a large canal from the Kuram river. The fighting men amount to 160.

Teeree Tang is under Malik Nasro, and contains two hundred Teeree Tang. houses, and turns out 70 fighting men.

Khurmatoo is under Kuram Sher, and is cultivated from the Kuram Khurmatoo. river. The fighting men amount to 80.

Thattee and Maramzyes are under Malik Himmat, and contain Thattee and Maramzyes. one hundred and twenty houses. There is a great portion of waste land.

Kot-i-kandiyalee is under Maliks Akram and Aizam. It contains Kot-i-kandiyalee. one hundred houses, and 50 fighting men.

Gandiyabee Killa, known as Zanjeer Kamar, is situated on an eminence, and is now in ruins. It is reported to have been built by the former Hindoo rajas. There are remains of bastions, a stable, and tank. Of the wonderful zanjeer; or chain, from which the place derived its name, there is of course no vestige.

Siah is under Gul Mahommed. The cultivation is carried on from Siah. the Kuram river. The number of fighting men is 60.

Tareekhel was formerly a dependency of Cohaut, it is now independent. They are neighbours of the Afreedees. The fighting men amount to 200.

Gadakhel is under Shahzadah and Khanawadah. The cultivation depends partly on the rain, partly on canals. There are four hundred and fifty houses. The fighting men amount to 200.

Dhoodah is under Mahboob. The cultivation depends on the rains.

Dhoodah. There are four hundred houses, and 80 fighting men.

Shadeekhel, Kamal, Mandakhel, Kotree and Muchkee are under Shadeekhel, &c. &c. Malick Samad, &c. There are four hundred houses, and the revenue amounts to 6,000 rupees.

The tappa of Bazee is under Naib Gul Maz Khan, whose family formerly enjoyed the whole of Cohaut. He is by tribe a Shakookhel. The revenue, including the customs, trades, and weavers and tax on herds amounts to 41,000 rupees, and the fighting men of the whole tappa amount to 1200. The people of Bazee are all Musselmen of the Sunnee creed.

The tappa of Samalzye is inhabited by Sheah Musselmans, and is farmed by Sher Alee Khan, Izzatkhel, father-in-law of Sirdar Sultan Mahommed Khan. The dependencies of Samalzye are as follow:—

Mouza Aleeezye, under Ghulam Khan, is situated in a valley, having Aleeezye. to the north, across the hills, the tribe of Sepa, outside the fort are two hundred houses. The shrine of Myan Fatteh Shah is situated in the suburb of Koh. The fighting men amount to 80.

Ustarzye-i-Paieen contains a mud fort. It has two gates, one to Ustarzye. the east, the other to the west, and two hundred houses. The fighting men amount to 100 Ustarzye-i-Bala under Meerza, and contains a mud fort with two gates both to the north. There are one hundred and fifty houses, and the same number of fighting men.

Kachee Bala-o-Paieen, under Muazim Sher, is divided into four Kachee. mouzas, each containing a mud fort, and two large towers, and from four hundred to five hundred houses, as well as vineyards and pomegranate gardens. The fighting men amount to 200.

Marye Bala-o-Paieen, under Jafar Alee, is situated on an eminence, Marye. having two hundred houses below, and 150 fighting men. This place borders on the Teefa Pass, at the bottom of which are seven water-mills. The revenue of the whole tappa amounts to 22,00,

rupees nominally, the whole sum being seldom realized. The people of Samalzye are noted for bravery; the cultivation depends chiefly on the Kuram river.

The tappa of Meeranzye is a dependency of Hangoo, as far as Tal-Meeranzye. i-Bulandkhel. From Cohaut I proceeded to Ustarzye and thence to Marye, where I took up my quarters in a mosque, where a man presented himself, saying, he had two wives, a grown-up son, and a daughter-in-law; that he had committed some gold and rupees Theft. to the keeping of his senior wife, which had been lost, and requested me, as I was a fakeer, to ascertain who had taken it. I accompanied him home, where I found all the members of the family disputing and interchanging high words. I enquired of the master of the house which wife was youngest. He replied—the one I have just married, and the management of the house is entirely in the hands of the boy's mother. I asked him which he liked best. He replied one has got old, and the other is pretty and young, what more need I say.

I requested that they should all assemble. On their presenting Conjuring. themselves, I wrote all their names on separate slips of paper, and folded them up separately, filling all with ashes; but one, which I filled with detonating powder. I then gave a stone into the hands of the Malik, and ordered him to strike each paper, as I gave the signal during my incantations. On the explosion from one of the papers ensuing, I pretended to read the name of the thief, allowing the party the night to consider, before being exposed. Towards night-fall, having occasion to go out, I was followed by the senior wife, who taking hold of my skirt, confessed she was the thief; having Discovery. been driven to the act, in the hope of attaching suspicion to her rival, and thus, estranging her husband's affections from her. She promised to return the articles, provided I would not expose her, and would do something with her husband, so as to induce him to visit Stipulation. her once a week. I promised this, and the articles were brought to me at midnight in the mosque. In the morning I sent for the husband, and presenting him with the missing property, enjoined him to treat his first wife with greater consideration. He after some disputation, agreed to visit her once a month.

My digression from Cohaut to Peshawur, my return to that place, and my journey to Teera, occupied eighteen days.

1st Mohurrum.—Proceeded seven kos to Sultanzye in the district of Teera, passing the Barah river and the Koh-i-Boland Sultanzyes. pass, which is difficult even for footmen. The sides of the hill are covered with jungle, and the cultivation is carried on with the water of the Barah river. There are three forts here, two belong to Band Alee Khan, Sultanzye Orakzye. The inhabitants are partly Sunnee, and partly Sheah Musselmans. The other chief is Alam Khan, Orakzye. The forts have all four bastions fitted to bear artillery. The fort in which Alam Khan resides is separate, and has a *mehman khanna* above the gateway, a small gun, without shot or ammunition, of any description, is also near the entrance. There are twenty-two Shaheens mounted on the bastions. The fighting men amount to Alam Khan. six hundred who are independent. Alam Khan being in the employ of Sirdar Dost Mahommed Khan, generally spends his time in Basoul, Jelalabad, and Cabool. He has eighty horses of his own, and receives 24,000 rupees pay. He has a jaghire in Basoul. In the times of the former Sadozye kings, the Orakzyes received from 22,000 to 25,000 rupees a-year. They are friends with the people of Jamrood, Barakee, and Alam Guzeer, and enemies of the Abdul Azeekhels and Maneekhels. To the east is the Bangash road, to the west Usmankhels and Istareekhels, to the north hills and the road to Peshawur, and to the south hills, and beyond them, the Hurbuz and Maneekhel.

2nd Mohurrum.—Proceeded seven kos to Abdul Azeekhel. The Abdul Azeekhel. cultivation chiefly depends on the rain. There are five hundred houses. The headman who is also a holy man, is Maddat Shah. Meer Maddat Shah, he is a *peer*, or spiritual chief of the Sheahs of this neighbourhood.

The inhabitants have separate forts, and muster 450 fighting men, a lawless set. They are friends of the Maneekhels, and enemies of Mastee and Shekhan.

This year, which was one of scarcity, wheat sold at four and half *akahs* the rupee, and juwar at five or six *akahs* [one *akahs*, seven Peshawur seers.]

The inhabitants carry their hatred of the rival sects of Sunnees Sheeahs. to an inveterate extent, and during the ten first days of the Mohurrum, their penances are very severe. They fast the

days, and hold their meetings in the house of Maddat Shah, who has the most unbounded influence over his disciples, the Maneekhels and Abdul Azeekhels.

In these districts, apples, grapes, mulberries, walnuts, pears, pomegranates; in short all the Cabool fruits are produced in plenty.

In the hot weather, the situation is peculiarly pleasant. To the east is Garee Rustam Khan, to the west Mastee and Shekhan, Mullakhel and Baramadkhel, to the north hills, and beyond them, the Afreedees and the road to Jelalabad, and to the south the Maneekhels. They have never paid revenue since the time of the Chaghatye kings.

During my stay with Maddat Shah, I saw none of the assumptions Maddat Shah. that the Sunnees give him credit for; but his disciples, certainly, are in some instances, beyond bounds in the homage they pay him. In their prayers, for instance, they ask forgiveness in his name and those of his children and forefathers.

During my stay, my Persian Meerza who was a Sayad, made a mistake, which was nearly proving of serious consequence. He one day seated himself on the vacant cot of one of Maddat Shah's sons. I overheard the bye-standers muttering a threat, that if he were not a guest, they would kill him for the insult. I explained, in extenuation, that my companion was a Sayad, as well as my host. "He may be," was the reply, "but for all that, he shan't presume to sit on that cot."

The Bangashees perform the pilgrimage to Meshed. I have often met them in Persia, and whenever the name of Maddat Shah is mentioned, if they are seated, they immediately rise, and press the forefinger of their right hand, half closed, first to their lips and then to their foreheads.

Maneekhel is pleasantly situated in a valley. In the summer, this place enjoys the best climate in all Teera. The cultivation is carried on by spring and river water. The winter here is very severe; but the poor people find plenty of firewood near at hand. There are one or two mills on every canal. There are six hundred houses of stone and mud; and the fighting men amount to 800. They are enemies of the Sunnees of Mastee and Shekhan. The Sheahs of the neighbourhood are said to be descended from a converted Hindoo, named Shamal, and the Sunnees of

one, named Karah. To the east are hills, to the west hills, and beyond them Bangash, to the north the Abdul Azeekhels, and to the south hills, and beyond them Bangash.

Baramadkhel is situated on an eminence, in a valley beyond Baramadkhel. Maneekhel. The inhabitants are Sheeahs. The cultivation depends on springs and water from the Teera river. There are one thousand houses of stone and mud, and 600 fighting men. They are friends with the other Sheeahs, and of course enemies of the rival Sunnee tribes. The chief men are Ghulam Khan and Meer Ahmed Khan, Orakzyes. To the east is Karnar, to the west Maneekhel, to the north hills, and to the south Samal.

Usmankhel and Ferozkhel are inhabited entirely by Sunnees. The cultivation depends on the Teera river. Every village has its separate mud fort. There are five hundred and forty seven houses. Usmankhel is to the north-east, and Ferozkhel to the north. There are no regular appointed Maliks. The man who entertains best is chief for the time. The fighting men amount to 4 or 500.

In every village of Teera there is a Hindoo's shop, and the Hindoos of both sexes in this district wear the same clothes as the Musselmans; and therefore cannot be distinguished by a stranger at a glance. The fruits here are very fine in the summer. The inhabitants dress in loose trousers, confined at the bottom; and in long shirts, sewn double and treble, reaching to the knee, and sometimes to the ankle. Dark-blue lungees compose their head dress. The women wear rows of silver coins as buttons on their vests.

Beyond Ferozkhel is Kilah-i-Gehrajgal in the Afreedee country, situated in a valley, of which the land is of a peculiar red colour, and through which the Barah river runs as well as the road to Basoul and Cabool. I was directed by Major Leech to visit a place called Rajgurh. I never heard of any place nearer approaching the name than this. To the east of Ferozkhel are the Zakhakhel Afreedees, to the west the Masteekhels, Shekhans and Mulllakhels, to the north the road to Cabool, and to the south the Abdul Azeekhel. The inhabitants are independent. On arriving near Usmankhel, I met a young woman proceeding to draw water; she enquired who I was, and received for answer from one of my men, that I was a fakeer of a saintly character. She invited

me to her house, where she presented me with a chillum, some raisins, and jalghozas, paying me attentions that did not seem to excite the jealousy of her husband; and at nightfall, brought a cot for me to sleep on. The unblushing overtures made by this woman in the course of the evening, and many other incidents on my journey, led me to

form a very poor opinion of the simplicity of the country people of Afghanistan. They seem far to surpass the towns-people in the looseness of their morals.

Ustarzye borders on the Khyber and Basoul. The inhabitants have all separate forts, amounting to twenty. There were formerly three thousand houses. At present there are even more, some at the fort, and some at the top of the table land. The cultivation depends partly on the rain, and partly on spring water. There is no fixed Malik. He who entertains most is the best man, and possesses greatest influence. The fighting men amount to upwards of 3,000. They are very independent, and great robbers. They are of the tribe of Orakzye. They are friends of the Afreedees, and enemies of the Abdul Azeekhels and Maneekhels. They are, as might be expected, Sunnee Musselmans. To the east are the hills and the road to Peshawur, to the north are the hills, and to the south are the Abdul Azeekhels.

Before my arrival at Ustarzye, my fame as a fakeer had preceded me. Immediately after my arrival a man waited on me, and represented that he had a very beautiful daughter, who regularly every Sunday and Wednesday went mad, and sometimes struck herself, and

sometimes her relations; that she was engaged to be married, and her intended had become averse to the match ever since the commencement of these fits; intreating me to cure her. I became at a loss what to do, and what puzzled me more, was, that the day of my arrival was a Saturday and the next day the girl, as was her wont, had the mad fits; and I was taken to the house and found her stretched at full length, heaping abuse on all her relations. I soon discovered that she was shamming, and commenced operations accordingly. I drew a line on the ground around her, and wrapped some brimstone in a rag and gave it to my servant, while I covered my own head and commenced incantations; telling the servant to light the rag, and apply it to her nostrils; while I ordered the father to hold her firmly until I told him to release her, warning him, that if he did

Another devil
cast out.

so without my telling him, the devil, of whom his daughter was possessed, would kill her. On the burning brimstone being applied, she begged to be released in a sensible tone of voice. This I would not allow, until she spoke in the person of the possessing devil, and promised he never would return. I explained that it was necessary to give a written charm to prevent the return of the devil, and explained to the mother, that I wished to see the girl in private. On her being brought, I questioned her before the mother about the devil; she replied, that as long as the fakeer (myself) remained, he (the devil) would not possess her; but immediately on his (my) departure, he (the devil) would destroy her. After this, the mother motioned her daughter to depart, who refused, saying she would stay and wait on me. When we were

Disclosure. alone, the girl told me the truth; which was, that she had

a lover, and played these tricks that the match with the young man to whom she was engaged, might be broken off. I promised to aid her, and told her to get her betrothed to visit me. In the morning the young man came and asked me to do all I could to cure his intended of her fits. I explained that if she got cured, the devil would attack him instead; and proved it by my old apparatus of the bowl of dirty water and the steel spring, which ejected his name as the fated one. He was much frightened, and entreated me to point out a remedy. This I did by assuring him, he could never marry the "possessed," and live; and that therefore, he had much better take the other sister, who was also marriageable. This, after sometime was, with my assistance, arranged. The successful lover, who had hitherto remained in the back ground, now visited me, bringing with him some cooked dishes. He afterwards accompanied me one stage as a guide, and I left Ustarzye with the satisfaction of having caused the happiness of two beings at no one's expense.

The cultivation of the Masteeekhels depends on spring water. Their habitations are partly below, and partly on a rising ground. They have all separate forts, amounting to about twenty. The headman is Jemadar Misree. They amount to three thousand fighting men, and are friends of the Shekhans and Mullakhels, and enemies of Abdul Azeekhels: and they are always armed night

Hospitality. and day accordingly. This tribe and that of Shekhan are noted throughout Teera for their hospitality. To

whole ten the east are the Abdul Azeekhels and Maneekhels, to the west the Aleekhels, Sherzyes and Mamoozyes, and to the south the hills.

Shekhan extends to Naryab. There is no headman. The fighting Shekhan. men amount to three thousand. To the east are Abdul Azeekhels, and to the west the Mullakhels and Alee Sherzyes. The Ismailzyes. cultivation of the Ismailzyes depends on the Samal canal, which runs towards Cohaut. It is divided properly into Akhel Rabiakhel and Ismailzyes. The headman is Sirdar Sayad Shah. They are friends of the Aleekhels. The fighting men amount to 1,000. To the east are the Alee Sherzyes, to the west Shekhan, to the north the Afreedees, and to the south the Tortareens.

The Alee Sherzyes have six mouzas, and seven forts. The cultivation chiefly depends on the rain. The headman is Mazulla Khan. The fighting men amount to 3,000. To the east are the Mamoozyes, to the west the Shekhans and Masteeekhels, to the south Bangash, and to the north the Afreedees.

The cultivation of the Mullakhels depends chiefly on the rain. Mullakhels. There are six mouzas dependent. The habitations are in a valley. The chief man is Mulla Ahmed Orakzye. The fighting men amount to 700. To the east are the Aleekhels, to the west Abdul Azeekhels, to the north the Shekhans, and to the south Bangash.

The cultivation of the Mamoozyes depends on the Barah river. Mamoozyes. There are thirty or forty forts under Mazulla Orakzye. The fighting men amount to 400. To the east is Chamkanee, to the west Masteeekhels and Shekhans, and to the north the Afreedees.

The Chamkanee Orakzyes inhabit the base of the Seefed-koh range. Their cultivation depends on the rain. The Chamkanee. fighting men amount to 3,500. The headmen are Noor Alee and Arsalla. They have internal feuds. To the east is Teera, to the west are Kuram and Bangash and the Shrine of Lot, to the north Suefd-koh, and to the south the hills. I remained in Teera eleven days.

The district of Kuzeer is in a valley beyond the Maneekhel Pass, Kuzeer. the descent into which is very difficult. There is a covered tank of rain water near the top. The Pass is covered with

trees. The inhabitants are called Bar Mahommedkhels. There are two forts on the plain, and three on the hill. The cultivation depends partly on springs, and partly on the rain. The people live in caves.

Caves. The headman is Meer Ahmed Khan. The number of fighting men amount to 400. To the east is Bangash, to the west

the Maneekhel Pass, to the north the hills, and to the south hills, and beyond them the Bengash country. The inhabitants are partly Sunnees and partly Sheahs. The latter are disciples of Meer Ahmed

Spiritual Chief. Shah, who resides among the Abdulla Azeekhels, and Myan Noor Shah, who resides at Maree, a dependency of Cohaut.

On arriving at Kuzeer I put up in the mosque, when an old man presented himself, and entreated me to pay a visit to his son, who was ill at home with dysentery. I assented, and found the young man much reduced, and a young interesting wife mourning over him. I administered some warm tea, with a little ginger to him, which seemed for a time, much to the delight of his friends, to revive him. His father accompanied me a stage as a guide.

Buroonee. Buroonee is situated at the foot of a hill; the inhabitants are partly Afreedees, partly Orakzyes. The Afreedees border on the Khyber. The cultivation depends on the rains.

There is no headman. They are friends of the Ferozkhels. To the east are the Kukeekhels and Rabiakhel Afreedees, to the west the Afreedees, to the south the Ustareekhels, and Caree-i-Alam Khan Orakzyes. They are independent.

13th Mohurum.—Proceeded to Hangoo, known as the tappa of

Hungoo. Meeranzye. The cultivation depends partly on wells, partly on running water. There are one hundred and forty houses, fifteen Hindoo shops, seven dyers and blacksmiths, and twenty-eight lungée weavers. Azeezulla Khan is hereditary chief of the Meeranzye tappa, and the authority of his ancestors extended to Naryab Tal and Bulandkhel; but he is now a fugitive from the tyranny of Sultan Mahommed Khan.

At present the chief men are Sadulla and Samad Bangashees. Hangoo is farmed by Naib Darbarza Bangashee, a resident of Togh, for 30,000 rupees. Out of this he draws his own pay, which amounts to 5,000 rupees. He has 60 horse and 730 foot; and he sometimes

has as many as 110 horse for the revenue collection. Hangoo is divided into the following mouzas: Raisan Ibrahimzye, Poodokhel, Division. Bazar, Malkhoora, Ragho, Garee Saiyadha, Togh, Bandah-i-Shekhan, Bhookhel, Baukhounnee, Bagdoo &c. &c. The inhabitants of Hangoo are nearly all Sheeahs. There are six springs in the tappa of Meerazy; three to the north, at the foot of a hill near the shrine of Meer Shah Tootee and Meer Shah Umar, and three to the south. In former times, the number of fighting men amounted to 3,000. At present they do not muster 1,000. They are friends of the Khattaks, and enemies of the men of Naryab, Dar Samand, Tal, and Bulandkhel. To the east is the road to Cohaut, to the west the road to Maryab, to the north hills, and beyond them Teera, and to the south the Khattaks.

The Khattaks, Bangashees, and men of Teera, all wear grass sandals, Dress. and the women go bare-footed. Hajrab yahood (lapis judaicus) and shadaniy adasee (blood stone) are found here, near the shrine of Meer Shah Tootee. At this place I broke off another match, at the earnest entreaty of one of the parties, a pretty young girl, who declared she would destroy herself if I did not release her from it, and thus her blood would be on my head. In the excess of her gratitude, she tore her silver necklace off, and pressed it on my acceptance; I however would receive nothing but a few roasted fowls.

Another marriage broken off.

15th Mohurru.—Proceeded seven kos to Kahee, which was formerly dependent on Hangoo, passing two tanks on the Kahee. road, and a jungle of “mazr” and wild flowers of a yellow colour. The cultivation depends entirely on the rain, and they drink nothing but rain water. There are six hundred houses, and 500 fighting men, under Azeezulla Khan. They are friends of the men of Naryab, &c. and at enmity with the Khattaks. To the east is the road to Hangoo, to the west Naryab, to the north Teera, and to the south the Khattaks. The revenue formerly amounted to 240 rupees.

Sometime after my arrival at the mosque a man presented himself, took hold of the skirts of my garment, and explained, that he was a “shikaree,” (slang for a thief,) and that he had been unsuccessful for sometime past in getting “shikar” (game,) and now wanted my prayers for his better luck. I complied

Pray for a Thief.

with his request, covered my head, and muttered something. He immediately started to put my prayers to the test that very night. He was unsuccessful, and it came to my ears that he had declared I was a cheat, and would strip me on my next stage.

I started the next morning, and after proceeding some distance, saw that my friend of the last evening had kept his promise, and confronted me with three fellow-thieves. I lost no time, on his coming in sight, in placing some detonating powder on a stone; on his commencing to abuse me as a cheat, I rested my walking stick, in rising, on the powder, saying at the same time, "Whatever is done, is done by the will of God." The usual explosion ensued, and the thief, in repentance, threw himself at my feet.

16th Mohurrum.—Proceeded five kos to Naryab, (known as Badah-khel), the cultivation of which depends on a running stream that comes from the direction of Teera. There are seven hundred houses, and sixty shops. There is here an extensive sale of horses and mules. The Wuzeeree unbeaten iron is sold for twenty-eight seers the rupee. It is beaten here and sold at twelve and fourteen seers. There is a mud fort, having two gates. A canal runs through the bazar. Near the gates is the shrine of a descendant of Myan Tahir Shah. The headmen are Aner Khan and Nijabat, Badahkhel Bangashees. The fighting men amount to 500. They are friends of the Habiakhels, and enemies of the men of Zeemukht. To the east is Kahee, to the west Dar Samand, to the north Teera, and to the south the Khattaks. The revenue, if enforced, amounts to from 900 to 2,000 rupees.

17th Mohurrum.—Proceeded five kos by night to Dar Samand, having procured the company of two Hindoos, who were furnished with two guards, (Badrakas.) The Persian writer, who used always to lag behind; on this stage, as there was danger, to my astonishment I observed running a-head, with his shoes in his hands; and only overtook him at the next stage. On inquiring the reason of his unusual activity, his reply was: "Fear is the brother of Death." There are two or three mud forts in Dar Samand. There are two springs, one called Neelee to the north, and the other Gulab to the south, which springs from the Gulab hills. It is also called Regee. There are seven hundred

houses. The headmen are Bakar and Turabaz. The number of fighting men amount to 700. They are friends of the Zeemukhts or Torttareens, and enemies of the Khattaks. To the east is Naryab, to the west Tal, to the north the hills, and to the south the Khattaks.

At this place, the Persian Meerza was nearly getting into a scrape, from which I was only just in time to extricate him; having first recourse to admonishing him harshly. He had accepted the invitation of a mistress of one of the houses in the village to supper, after having written out for her a charm she requested, and I found him making himself quite at home in her house, and the intimacy gradually growing to an indiscreet extent.

19th Mohurram.—Proceeded six kos to Tal, known also as Badah-

Tal. khel, which contains a square mud fort, having one of the bastions full to bear artillery. The cultivation partly

depends on the Kuram river, which takes its rise in the Sufedkoh mountains, and passes through Kuram, Tal, Cohaut, Kuram river. Bannoo, and Murwat; and partly on a spring to the north, called Sangroyah. There are seven hundred houses of Musselmans, thirty five Hindoos, and twelve shops. There is a great horse and mule market here. There is a very large cave in the Zeemukht hill, which has never been explored, which has a draught of air always issuing from it, which makes a noise like the turning of mill-stones. Near this, there is also an impression on the rock of the palm of a hand, of which there are so many known in Khorasan as "Panjah-i-Shah," and looked upon as the impression of the

Panjah-i-Shah. hand of Hazrat Aly. There are flint rocks near, on which are two shrines, one of Peer Shah, the other of Peer Umar Shah; also an antimony mine of inferior quality,

Antimony. which however is exported to Multan. There are two Hindoo merchants at Tal. Better flint is to be procured, of a black colour, at a kos further off; which however, is difficult of access on account of the Wuzeeree robbers. The headmen of Tal are Bhahawadeen and Duranee, Badahkhel Bangashees. The fighting men amount to 600. They are friends of the men of Naryab, Kabee, and Kuram, and enemies of the Khattaks and Zeemukhts. To the east is the road to Dar Samand, to the west the road to Kuram, to the north the hills, and to the south the Kuram river. The inhabitants are

Alam Sher contains two mud forts, and two hundred houses, under
Alam Sher. Jahangeer Khan, who is chief of all the Toorees, and

Bangash-i-Bala. The number of fighting men amounts, to 150. To the west is Shilozan, to the east the road to Zeemukht, to the north hills and the valley of Kirman, which contains the shrine of Fakhr-i-Alam, the father of Maddat Shah, the spiritual chief of the Bangashees and Toorces, beyond which is the Sufed-koh range, and to the south Kuram.

Ahmedzye contains ninety-four houses, under Zamasp and Meerza Gul, who musters 80 followers.

Bilandeekhel contains one fort and two hundred and twenty houses, under Fattah Khan, who musters 200 followers.

Aza Khel contains forty-five houses, under Neyamat Khan, who musters 35 followers.

Tahda contains one hundred and twenty houses, under Jahan Khan, who musters 100 followers.

Kamshal contains two forts and two hundred and fifty houses, under Shah Hasan, Gul Hasan, and Meer Hasan, who musters 260 followers.

Pishra contains forty houses, under Gul Mahommed, who musters 35 followers.

Meerza Khan contains one fort and one hundred houses, under Meer Mahommed, who musters 80 followers.

Fattah Khan contains one hundred houses, under Alam Khan and Nasar Khan, who muster 90 followers.

Kot contain five forts and two hundred houses, under Fattah Khan, who musters 180 followers.

Sheraka contains two forts, under Buzurg, who musters 100 followers.

Toolak contains one fort and fifty-five houses on an eminence over the river, under Khoja Baz, who musters 60 followers.

Kharlachee contains one fort and one hundred and five houses, under Shaheen, who musters 120 followers.

Lalmee contains one hundred and forty houses round a fort, under Guldad, who musters 150 followers.

Aleezye contains three hundred houses, under Habeebulla Bangashee, who musters 280 followers.

Kirman is situated partly in, and partly out of a valley, and consists of twelve or more forts, under Futulla and Meer, who muster from 900 to 1000 followers.

Zeeran contains seven or eight forts, each fort having thirty or forty houses around it, under Mahommed Meerza and Hyder Alee, who musters 607 followers.

Koh Badshahkhel contains two small forts. • The number of fighting men amounts to 140.

Ghundee contains one fort, and three or four other small ones are dependent on it, and two hundred and fifty houses, under Ganjan Khan, who musters 200 followers.

Ahmedkhel contains one fort, and turns out 120 fighting men.

Shilozan is a beautiful district, containing twelve small forts and ten streams, that all have their rise in the Sufed-koh, and fertilize the whole of Kuram. Silk is produced here of a very fine quality, and all the inhabitants engage in the produce. The headman is Meerza Hasan, whose sister is the wife of Dost Mahommed Khan, and mother of Mahommed Afzal Khan. The fighting men amount to 800, who are all Bangashees.

Paiwar contains six or seven forts, each fort having one hundred houses, under Noorak and Moosa, who muster 140 followers. The men of this place act as guides and guards to the Bangashee and Tooree pilgrims, who, as Sheeahs, could never otherwise pass the country of their inveterate enemies, the Jajeess, who are Sunnees. These men take them by unfrequented hill roads to Logur, and receive from each pilgrim in return, 2 or 3 rupees.

Notice of Bangash-i-Bala, known as Kuram.

From the entrance of the Chamkanee valley to Bulyameen, is geographically included in Bangash-i-Bala, and the Toorees have the territory.

The whole of Bangash-i-Bala is divided into twenty-nine miskalees, according to Meerza Hasan, partly as follow :—



The Darra-i-Chamkanee is situated in the Sufed-koh range. The fighting men amount to upwards of 3,000. The headmen are Baoo Khan and Arsalla. It is reckoned,

| | | | | |
|---------------------------------|-----|-----|----|------------|
| | ... | ... | 3 | Miskalees. |
| Deda, | ... | ... | 1½ | ditto. |
| Kirman, | ... | ... | 2 | ditto. |
| Bulyameen, Maghzye, and Bagzye, | ... | ... | 4 | ditto. |
| Jajeos, known as Zarakhel, | ... | ... | 1½ | ditto. |
| Ghundeeckhel, | ... | ... | 1½ | ditto. |
| Aleezye, | ... | ... | 1½ | ditto. |
| Ibrahimzye, | ... | ... | ½ | ditto. |
| Ahmedzye, | ... | ... | ½ | ditto. |
| Balkh, Kamshal, and Nahda, | ... | ... | 1 | ditto. |

The other details I did not succeed in procuring. The district is under Sirdar Dost Mahommed Khan. Its revenue amounts to about 52,000 rupees, of this the Dastar tax amount to 12,000 rupees. In former times, the Toorees, who have seized on Bangash, alone used to furnish 3000 foot and 500 horse, independent of Bangash-i-Bala; at present, including the latter, they might collect 5,000 foot and 800 horse. They are enemies of the Jajeos. They have much property, and most of them trade.

Contingent.

The coarse rice of Kuram is famous, and the inhabitants chiefly live on it.

The inhabitants all dress in dark blue, and the only ornaments worn by the women are rows of small coins called Abbasee Kareem Khanee, sewn on their vests in rows. The trousers of the men are made tight below the knee. Their arms consist of selawas and long matchlocks.

The price of wheat, in plentiful seasons, varies from fifteen to twenty *thattees* (one *thattee* three Peshawur seers) the rupee, and in seasons of scarcity seven or eight *thattees*. The Hindoos of Tooree are only to be distinguished by their language, from the Mahomme-dans. The people of Bangash-i-Bala burn wood instead of oil.

On arriving at Paiwar, I put up as usual in the mosque, where a man presented himself, and requested me, as a fakeer, to tell him, whether the object he had in view would be accomplished or not. I drew some unmeaning lines on the ground,

Prediction.

and told him to count them by fours, telling him that if one remained, his project would succeed; if two, it was doubtful; and if three, it would fail. He counted, and much to his delight, one remained. Promising if my prediction came true, he would make me a present of a mule, he took his leave. Some hours afterwards, I heard that his project had actually succeeded; which I learnt, to my astonishment,

Fulfilment. was no less a one than eloping with another man's wife.

I never however saw him or the mule again.

The people of Paiwar are enemies of the Jajeets, and friends of the people of Shilozan. To the west are the Jajeets, to the east Shilozan, to the north Sufed-koh, and to the south Chamkaneet. On starting from Paiwar for the Jajee country, as the Mangal robbers infested the road, and as there were Kuram and Sheeah merchants in the caffila, guards were procured to pass us over the Paiwar Pass to Kamshal. On approaching the Pass, twenty Mangal robbers joined the caffila;

Robbers. and Meerza Safdar Shah entered into conversation with them, and gave one a lungee, in which he had tied up

some walnuts and raisins, to carry for him. On crossing the Pass, these gentlemen walked off, taking the Meerza's property with them, who forthwith vowed never again to make acquaintance on the high road.

29th Mohurruum.—Proceeded from Paiwar seven kos to Maskaneet,

Maskaneet. which is in the Mangal territory; passing the Paiwar Pass, which abounds with *archah* trees.

30th Mohurruum.—Proceeded seven kos from Maskaneet to Sufed-koh, where I was stopt by wind and snow, at a fort in a valley, called Paryan, whence three valleys separate; one leading to Jajee, the second to Mangal, and the third to Logur. A short time after putting up in the mosque, a good looking young lad made his appearance, and gave me the usual salutation which I acknowledged, then approaching he took my hand, and with a sigh, said he wished to renounce the world and turn fakeer too. On enquiry, I found he had no relations but a widowed mother. I in vain tried to dissuade him, by pointing out the hardships and dangers of a fakeer's life. He insisted on remaining with me, and occupying himself in attending to my wants. When my companions had all fallen asleep, to my horror I found the young scoundrel was a hypocrite, and something much worse, from the

disgusting nature of the overtures he took that opportunity of making. The Mangals amount to 3,000, who are all independent.

Notice of the Jajee country where I arrived on the 1st Safar.

The Ahmedkhels are located in a valley, and have five forts, two Ahmedkhels. hundred houses, and 400 fighting men.

The Tarlakees are also located in a valley, and have three forts belonging, one to Malik Gul Khan, and the other two to his tribe. The forts contain eighty houses, and the number of fighting men amounts to 120.

The Meerankhels have six forts containing thirty houses each, one Meerankhels. belonging to Alee Gul, another to Meerjane, two to Sahib Khan, and two to Malik Madak. The number of fighting men amounts to 300.

Alishing is situated also in a valley, and contains twenty houses, and 40 fighting men.

Batela consists of two forts, containing forty houses, and 100 fighting men.

The Loonees have eight forts, containing two hundred houses, and Loonees. 400 fighting men.

The Ameenkhels have two forts situated on the high road, containing sixty houses, and 130 fighting men.

Ahmadkhel consists of one fort, forty houses, and 100 fighting men.

The valley of Dreplara contains two forts, one hundred and twenty houses, and 400 fighting men.

The Aleekhels have five forts, one belonging to Khanee, one to Aleekhels. Abdulla, two to Khanzadah, and one to their tribe. There are altogether two hundred houses, and the number of fighting men amounts to 600.

The Mangals and Jadrans are also situated in a valley, having to the east Khost and to the west Gurdez. They have in Mangals and Jadrans. all 250 forts and 500 black tents. They are perfectly independent, and pay revenue to no one. A great quantity of the hilly lands are laid out in terraces and cultivated.

The Hasankhels have three large and four small forts, containing three hundred houses. The number of fighting men is Hasankhels. 1,000. There are many gardens here.

Kochee consists of three forts, containing one hundred and fifty houses, and numerous gardens, and 400 fighting men.

The fort of Shah Mahommed contains fifty houses, and 200 fighting men.

The fort of Sarwaneekhel contains fifty houses, and 100 fighting men. The apricot gardens are numerous.

The fort of Malik Myandad, and another of the tribe, contains thirty houses, and 100 fighting men. There is continually rain at this place.

The fort of Saiyadee contains eighty houses, and 300 fighting men.

Description of the road from Jajee to Khushee, (where I arrived on the 2nd Safair.) in the district of Logur.

Beyond Jajee is the narrow valley of Hazardarakht, which is a complete jungle of *archah* and *sanobar* trees. Beyond this is the valley of Dreplara, which is six kos long.

Thence is the ascent of Shutar garden, where there is good pasturage. There is a mine here of a light-green-coloured stone, which is very heavy.

Beyond the Kotal or Pass, are Ghiljies and Ahmedzyes, who are dependent on Logur, as far as Khushee.

Khushee, where I arrived on the 2nd Safar, is a valley having four forts, containing two hundred houses, numerous gardens, and 50 *kulbas* of cultivated land. The number of fighting men is five hundred. There are two shrines; one known as Khoja

Punjab. Hasan, and the other as Khoja Khidr, where there is a Panjah. This place is a jaghire of Nawab Jabar Khan.

Zarghoon Shahr, which I reached on the 3rd Safar, is situated on a plain having small forts on the skirts of the hills. Zarghoon Shahr. There is a shrine of Khoja Sadr-i-Auliya. The inhabitants are partly Afghans and partly Logurees, (Lahogardees). There are one hundred houses, three karezes, and three gardens. The fighting men amount to 420.

From Cohaut to Cabool, via Hangoo, Dar Samand, Tal, Naryab, Gun road. Kuram, Paiwar, Jajee, and Khushee, there is a gun road.

On arriving at Cabool, which I did on the 4th Safar, I received Arrival at Cabool. from Captain Burnes 20 rupees for travelling expences; remained three days and setting out, joined my employer at Completion of Tour. Candahar, on the 15th Safar.

Proceedings of the Asiatic Society.

(Wednesday Evening, 5th July 1843.)

The regular monthly meeting was held on Wednesday evening the 5th July, and by invitation from the Honorable the President, the Society assembled at Government House, its own premises being under repair.

The Honorable the President was in the chair.

J. W. FULTON, Esq. Barrister at Law, was ballotted for and declared duly elected; the usual communication was ordered to be made to him.

The following Books presented and purchased were on the table:—

Books received for the Meeting of the Asiatic Society, on the 5th July, 1843.

The Calcutta Christian Observer, July 1843. New Series, vol. iv. No. 43. Presented by the Editor.

The Oriental Christian Spectator. Bombay, June 1843, vol. iv. No. 6. Second Series. Presented by the Editor.

Jameson's Edinburgh New Philosophical Journal. Edinburgh, 1842, vol. xxxii. No. 63. (Purchased to complete the vols.)

Proceedings of the Geological Society of London, vol. iii. part ii. Nos. 89 and 90. Presented by the Society.

Journal des Savants, Octobre, 1842, Paris. Presented.

The Calcutta Literary Gleaner, July 1843, vol. ii. No. 5. Presented by the Editor.

The Annals and Magazine of Natural History, February and May. London 1843, vol. ii. Nos. 68 and 71. Purchased.

Yarrell's History of British Birds. London 1842, parts 34, 35, 36.

Bellefond's Memoire sur le Lac Moeris, publié par la Société Egyptienne. Alexandrie, 1843. Presented by C. B. Greenlaw, Esq. on the part of A. S. Walne, Esq. of the Egyptian Society of Cairo.

Niebuhr's History of Rome. London, 1842, vol. iii. Purchased.

Antiquitates Americanæ. Edidit Societas Regia Antiquarium Septentrionalium. Studio et Opera C. C. Rafn. Hafniæ, 1837.

Chinese Drawing of the Porcelain Tower at Nankin, with description. Presented by J. McCann, Esq.

History of Hyder Naik, Nuwab of the Carnatic, published by the Oriental Translation Society, as translated from an Original MS. of Meer Hussun Ali Khan Krinnani, by Col. W. Miles. From the Society.

The Secretary reported as follows:—

That the books sanctioned to be sent to Mr. König, bookseller of Bonn, in exchange for the publications forwarded by him, were in course of shipment.

That the collected amount of the subscriptions for the Kit-Cat Portraits of the Honorable Sir Edward Ryan, and the Honorable H. T. Prinsep, Esq. stood as follows:—



Sir Edward Ryan's, ... 908 Rupees.

Hon'ble H. T. Prinsep's, ... 1,051 ditto.

It was resolved, that the following gentlemen be requested to form a London Committee for the fulfilments of the Subscribers' wishes :—

For Sir Edward Ryan's Portrait :—

The Honorable W. W. Bird.*

Honorable H. T. Prinsep.

W. Prinsep.

For Mr. Prinsep's Portrait :—

Honourable W. W. Bird.

Sir Edward Ryan.

W. Prinsep, Esq.

It was brought to the notice of the Society, that it would be highly desirable if a set of the Meteorological Registers from the Bombay Observatory could be procured and regularly supplied in future, and an application to Government for them was sanctioned.

It was also stated, that the Sub-Secretary, Mr. Piddington, had sent to France to Major Troyer, the following list of incomplete French works now in the Library, most of which had been presented by the authors, or by the French Government, and it was hoped Major Troyer would be able to obtain the completion of the sets as they might appear.

List of the defective Works received from France, for the Library of the Asiatic Society.

Agassiz, Histoire Naturelle des Poissons d'Eau douce de L'Europe Centrale. Planches, 1er livraison.

Cuvier Histoire Naturelle des Poissons, up to vol. xvi. 8vo.

Quatremere, Histoire des Mongoles de la Perse, traduite en Français, tome 1er, royal fol.

Livres des Rois, traduite en Français, par J. Mohl. tome 1er.

Histoire Generale des Huns, tome i. parties 1er and 2d, et tome ii.

Histoire des Sultans Mamloks de L'Egypte, par M. Quatremere, tome i. parties 1er et 2d.

Chronique D'Abou-Djafar Mohammed Tabari, par L. Dubeaux, tome 1er.

Jacquemont, Voyage dans L'Inde, 13 livraisons.

Ditto ditto Planches. Botanique 1er à 6, 8, à 34, 36, à 50. Poissons, 13, 15. Reptiles 9, 10, 12. Journal, 1 à 15, 17 à 19, 21.

Agassiz, Recherches sur les Poissons Fossils, livraisons 1, 2, 4, 8 à 13.

Ditto ditto Planches, 13 livraisons.

Vendidad Sadé, par E. Burnouf, Texte Zend, 11 livraisons.

L'Espagne Artistique et Monumentale, par P. de la Escosura, 1 livraison.

Harivansa, traduit par M. A. Langlois, 1er et 3er livraisons.

* On his arrival in England.



Description de L'Egypte, ou Recueil des Observations et des Recherches, Antiquités, Description, tome 1er.

Ditto ditto.—Antiquites, Memoires, tome 1er.

Ditto ditto.—Planches a ditto, tomes 1er à 5em.

Ditto ditto.—Etat Moderne, tomes 1er et 2d.

Ditto ditto.—Planches, id 1er et 2d.

Ditto ditto.—Histoire Naturelle.—Planches, tome 1er et 2d.

Ditto ditto.—Preface Historique et Avertissement, 1 vol.

The Secretary moved, that he be authorised to forward to Major Troyer, two complete sets of the Society's Oriental publications, with a view to obtain in return from the French Government or others, to which he might judge it advisable to present them, works published at their expence; one for the Russian, one for the Dutch, and one for the American National Institute were also mentioned. This proposal was approved of, and the Secretary was authorised to carry it into effect.

Read the following extracts from a letter addressed to the Acting Secretary, Mr. Piddington, by Professor Wilson :—

East India House, 29th April, 1843.

MY DEAR SIR,—Your communication respecting the missing copies of the Mahabharata and Journal had been anticipated by an application from the Société Asiatique, through Capt. Troyer. The books had been lying very quietly in the Library Store, as we knew not what to do with them. A letter from the Secretary to Government, to the Secretary to the Court, had been sent about the time the books were dispatched, but it did not specify for whom the books were intended, beyond the request that they should be sent to Allen and Co. The request was not attended to in the Secretary's department, nor was the letter communicated to the Library, and the books might have been here as long as the house stands, had not the application been made; a little more precision in future in forwarding any thing through the same channel will be expedient, and a private note to me intimating, that such and such books, &c. have been forwarded should always be added. Your memorandum specifies 56 copies of the 4th Vol. and 56 copies of the Index. There were no such things as the latter. There seems to be some mystery about this Index. I have applied to the Society already for copies for our Library, but no notice has been taken of the application, nor have any copies been sent to Allen. He seems to be ill supplied also with the fourth Volume, being obliged to borrow of us, and we have none to spare. It will be desirable to send home a few more copies, and to supply the 20 copies of the Index for this Library, the 56 for France, and an adequate number for Allen.* I take this opportunity of asking you, if the Society ever received any copies, and what number, of my Vishnu Purana, Sanscrit Grammar and Ariana Antiqua, and if they did receive them, I should be much obliged by being informed how they were disposed of. It is not from any curiosity regarding the Society's distribution that I wish for this information, but to guide my own. I have omitted sending copies to some of my friends in India, under an impression, that they might receive them from the Society, and I may have been mistaken.

H. H. WILSON.

* See Messrs. Allen's letter, which acknowledges receipt of these in the case per *Ellenborough*.



The following report from the Committee, appointed to conduct the publication of Sir A. Burnes' Drawings, was read and approved of—

Memorandum relative to the publication of Sir A. Burnes' Drawings.

The undersigned, who are the remaining members of the Committee appointed in 1841, for the publication of Sir Alexander Burnes' Drawings, beg to bring to the notice of the Honorable the President and the Committee of Papers of the Asiatic Society.

Original Committee.

Mr. H. Torrens.

Dr. Spry.

Dr. Pearson.

Charles Huffnagle.

H. Piddington, Secretary
to the Committee.

1. That the progress of the work is as follows:—

Drawings completed for publication, 31 0 0

Under examination, and with Messrs. Ballin' people or with the Artist, 29 0 0

Being a total of, 60 0 0

2. The Society's outlay to this day has been as follows:—

Paid to Artist, 850 0 0

For paper, (Messrs. Rushton and Bazar,) 1,012 0 0

To Printers and Colourmen, 2,632 0 0

Total, 4,494 0 0

3. Each Plate of 575 impressions, (of which 550 coloured and 25 plain,) costs as follows; viz.

Drawing on stone, 12 0 0

Printing and colouring, 87 0 0

Paper, 16 0 0

Co's. Rupees, 115 0 0

For 60 Sets is, 6,900 0 0

4. There remains to complete the publication about, 90 0 0

Total Cost 60 Sets ... 6,900

90 ditto, ... 10,350

Total Co's Rupees, ... 17,250

If all printed, these will cost at the preceding rates, 10,350 0 0

5. But though these plates will form a great ornament to a Volume of Transactions,* they cannot of course be

published without letter-press, which it was proposed should be composed of a digest of Dr. Lord's notes, with such additions as may be farther required by the Zoological Curator to the Society, than whom there is no one more capable of performing the task creditably to himself and the Society. The work thus completed, would (like Buchanan's and Russell's Fishes, or Russell's Serpents,) be of standard reference to the naturalist on the Indus, from Scinde to Attock; a foundation for much more labour of detail by future observers; and the best proof which the Society can afford of its desire to encourage every branch of the Natural Sciences, and to second, with all its means, the measures of Government when directed to these important objects.

* With Dr. Cantor's Chusan Zoology and Botany, they will make by far the most splendid work on Natural History, which has been published in India.



We beg to suggest, that the Honorable the President and the Committee of Papers direct official intimation to be given to Mr. Blyth, who is already aware of the design, that the plates are in a sufficient state of forwardness to warrant the commencement upon the letter-press, as the prompt preparation of the commentary with Dr. Lord's notes for the plates already finished will enable your Committee to recommend the publication of a 1st part of Burnes' Collection, forming a portion of the volume of the Society's Researches.

The Society will obtain, from the distribution of this splendid work, a means of repaying the offerings of other learned bodies, and of greatly extending its European reputation in the department of Natural History; such being the case, your Committee submit that urgent reasons are shewn for the speedy preparation of the requisite accompaniment to the plates.

Your Committee also beg to note, that two vacancies having occurred by the death and resignation of Members of the Society, it will be expedient to add to their present number.

(Signed) H. TORRENS.

C. HUFFNAGLE.

H. PIDDINGTON.

It was stated, that a letter had been addressed to Mr. Blyth, as recommended by the Committee, of which the following is a copy:—

E. BLYTH, ESQ. *Curator Museum Asiatic Society.*

DEAR SIR,—I am desired by the Hon'ble the President and the Committee of Papers to remind you, that there are now 30 of Sir A. Burnes' Drawings of the Zoology of the Indus finished and in our stores, and 30 more, in course of completion, being in the hands of the artists.

1. These 60 plates will cost in round numbers about 7,000 Rs., and there are still 90 more, of which some may be left unpublished; but the whole will, under any circumstances, involve an expenditure of at least Co's. Rs. 15,000.

2. The Society, as you are aware, contemplates making these plates part of the forthcoming volume of their Transactions, and it doubts not, with your known ability, to produce one of which it may be proud, and which the Naturalist can place side by side with those of Russell, Buchanan, and Gould; but while anticipating this, it feels most anxious, that the Letter Press should be forthwith commenced upon; for it is aware that it cannot but be ill done if done in haste, and you yourself know how advantageous it is in India, to have full time for corrections and revisions.

3. I am therefore desired to express to you, the especial wish of the Hon'ble the President and the Society, that your part of the work should be taken in hand without delay, as they naturally feel, that in so costly an undertaking, nothing should, if possible, be left to chance or done in haste.

The Society at large would also be much gratified to have your progress in the work mentioned from time to time in your Monthly Report.

H. TORRENS,

Secretary and Vice-President Asiatic Society.

A Portfolio of the finished and coloured Lithographs, with the original Drawings was upon the table, and greatly admired, as being far superior to any thing of the kind hitherto produced in India.



The Secretary stated, that in the month of January, the following letter had been received from Government :—

No. 1256.

To H. PIDDINGTON, Esq. *Officiating Secretary to the Asiatic Society.*
General Department.

SIR,—I am directed to transmit to you, Extract from a Letter from the Hon'ble the Court of Directors, No. 24 of 1842, dated 26th October, and a copy of the letter from the Austrian Ambassador therein referred to, respecting the researches of the late Mr. Csoma DeKörös on the origin of the Hungarians, and to request, that copies of the papers therein alluded to, may be forwarded to this Department, for transmission to His Excellency.

I am, Sir,

Your obedient Servant,

H. V. BAYLEY,

Deputy Secretary to the Government of Bengal.

FORT WILLIAM, the 28th December, 1842.

Extract from Letter, No. 24 of 1842, from the Honorable the Court of Directors in the Public Department, dated the 26th October.

We enclose as a number in the packet, the copy of a Letter from the Austrian Ambassador, respecting the Researches of the late Mr. Csoma DeKörös on the origin of the Hungarians, and we desire, that the papers requested may be forwarded to us for transmission to His Excellency.

To the Secretary of the Honorable United East India Company.

SIR,—My Government, to whom I transmitted the information which the Honorable Court of Directors of the East India Company was so kind as to forward to this Embassy, concerning the death of Mr. Csoma DeKörös, has recently expressed the desire to obtain for the Library of the Transylvanian National Museum, those of the papers (left by the deceased Traveller to the Asiatic Society in Calcutta,) which contain *Researches on the origin of the Hungarians*, and which are therefore of a particular interest for the above-mentioned Museum.

I have therefore the honor to request you may express to the Honorable Court of Directors, how much obliged the Transylvanian Authorities should feel, if by their kind intercession the Asiatic Society at Calcutta, should allow a selection to be made of those papers which so particularly concern Hungary, or copies duly legalized to be taken from and forwarded afterwards to this Embassy. I have, &c.

London, October 6th, 1842.

(Signed) NEUMAUN.

(True Copies,)

H. V. BAYLEY,

Deputy Secretary to the Government of Bengal.

This was sent to the Ecclesiastical Registrar of the Supreme Court for his information and for a reply, but owing, first to the non-arrival of Mr. DeCsoma's effects from Darjeeling, and latterly to the absence of Mr. Turton from Calcutta, no answer had been obtained from him till now, when the following was transmitted :—

*Estate of Mr. Alexander Csoma DeKörös' Deed.*

TO H. PIDDINGTON, ESQ. *Officiating Secretary to the Bengal Asiatic Society.*

SIR,—With reference to the letter to your address from the Deputy Secretary to the Government of Bengal, No. 1256, dated 28th December 1842, together with an extract of one from the Honorable the Court of Directors No. 24 of 1842, dated 26th October preceding, and copy of the letter from the Austrian Ambassador thereto subjoined, respecting the estate of the late Mr. Alexander Csoma DeKörös, Librarian of the Bengal Asiatic Society, left by you at my office sometime ago, for the purpose of my furnishing you with the information therein referred to, I have to apologize for my not having earlier replied to it, having been left at my office when I was much engaged, and it subsequently escaped my recollection, from no letter from you accompanying it.*

I now beg to acquaint you, that I have since received a communication from the Government of India in the Foreign Department on the subject through their Attorney, and I beg to forward here with a copy of my reply thereto, which will put you in possession of all the information that I possess on the subject, and which I have furnished to the Government.

I have the honor to be, Sir,

Your most obedient Servant,

THOS. E. M. TURTON,

Registrar and Administrator.

Calcutta, Supreme Court, Regr's. Office, 3rd July, 1843.

Estate of Mr. Alexander Csoma DeKörös' Deed.

TO T. B. SWINHÖE, ESQ.

Attorney to the East India Company.

SIR,—I have the honor to acknowledge the receipt to your letter of the 2nd instant, forwarding to me therewith, copies of one to your address from the Officiating Secretary to the Government of India in the Foreign Department, dated 24th ultimo, and of an extract from a despatch, from the Honorable the Court of Directors, dated 22nd March, No. 6 of 1843, regarding the estate of the late Mr. Alexander Csoma DeKörös, Librarian of the Asiatic Society of Bengal, and requesting me to furnish you with the documents therein referred to, in the manner required.

In reply, I beg to state for the information of the Government of India, that the event of the death of Mr. DeKörös having been reported to me as Ecclesiastical Registrar of Her Majesty's Supreme Court, I applied for and obtained letters of administration to his estate as in case of intestacy, and under and by virtue thereof, took charge of the Government Securities which remained in the hands of the Government Agent of this Presidency.

Mr. DeKörös having died at Darjeeling, the Superintendent of the station took charge of his effects, and did, under the direction of the Government, make over the same to me as administrator to the estate.

In June last year, Mr. Henry Torrens, as Secretary to the Asiatic Society of Bengal, addressed me a letter, handing to me therewith one in original to his address, from the late Mr. DeKörös, dated Calcutta, 9th February, 1842, and making an enquiry whether I, as administrator of Mr. DeKörös, with the full consent of the Socie-

* There is some misimpression here on one or the other side, but of no great moment: either a letter was sent, or the paper was left by me personally.—H. P.



ty, would feel justified to act on the orders of the deceased, by making over the funds and effects that might come into my possession in my official capacity of administrator of the deceased, to the President and Secretary of the Asiatic Society, under their indemnity, against the claim of the next of kin of the deceased.

Although I have not yet given any official reply to the above query, yet I have personally explained to Mr. Torrens, that I am not justified in supporting the claim of the Society under the directions contained in the deceased's letter, nor am I at liberty to treat it in any manner as a valid testamentary disposition of the deceased's property to the prejudice of his next of kin with reference to the late Act relating to Wills.

The Superintendent of Darjeeling has also lately made over to me on my application, the Thibetan Manuscripts collected by the deceased, which I intended to have made over to the Asiatic Society in deposit, on the guaranteeing to take due care of them, and to return them in case the next of kin of the deceased should not assent to their continuing there, and should require such re-delivery.

I beg to forward herewith, an exemplification of the letters of administration to the estate, authenticated copies of Mr. Torrens' correspondence with this office, and of the letter of Mr. DeKörös in favor of the Society, together with a copy of the Registrar's account current with the estate, made up to the 8th instant, exhibiting a balance on that day, in its favor of Sa. Rs. 3,000, and Co.'s Rs. 2,000 remaining invested in 5 per cent. Government Securities, and Co.'s Rs. 21: 13: 5, in cash, and 26 gold Dutch coins or ducats, and shall be obliged by your forwarding them to the Government for their transmission to the Honorable the Court of Directors, for the information of the next of kin of the deceased.

I have the honor to be, Sir,

Your most obedient Servant,

(Signed) THOMAS E. M. TURTON,

Registrar and Administrator.

Calcutta, Supreme Court, Regr's. Office, 26th June, 1843.

Read an application, transmitted by the Honorable Sir J. P. GRANT from Ramjoy Turlonkar, Pundit of the Supreme Court, stating, that as the Society had obligingly presented to him the first three vols. of the Mahabharata, he trusted that it would kindly complete its gift by that of the fourth volume now published. Ordered,—That the fourth volume and a copy of the Index be sent to the Pundit through Sir J. P. GRANT.

Read an application from A. A. SEVESTRE, Esq., requesting to be allowed to contribute to the subscription for the Portrait of Mr. H. T. PRINSEP, which was granted.

Read the following letter from Messrs. Allen and Co.:—

To H. PIDDINGTON, Esq.

Acting Secretary to the Asiatic Society of Calcutta.

London, 29th April, 1843.

SIR,—We have the pleasure to acknowledge the receipt of Mr. Torrens' letter as Secretary to the Society, dated 16th February last, acknowledging several of our communications and our account up to the 30th June last. We propose to render the continuation of the account at the expiration of a year from the date of the last.



We beg to call the attention of the Society to the paragraph of the letter of the 16th February, referring to Arrowsmith's Map of India, and also to enclose a copy of the original order for it. By it you will see, we had not the liberty to act for the Society, and we therefore complied strictly with the order, and forwarded "Arrowsmith's latest Map of India of the largest size," which is more than double the size of our Map, and we concluded was well known to the members of the Society. We need not point out how much more advantageous it would have been to us to have supplied the Society with our own publication, but we should not have been justified in doing so, when "Arrowsmith's" was expressly ordered.

It will be evident to the Society, that we are not in fault in sending Arrowsmith's Map, and we trust on a reconsideration of the matter, the Society will remove the Map from Messrs. Thacker and Co., where we are informed it had been sent for sale on our account. Had we committed an error, we would willingly have borne the loss of the price of the Map, viz. £18 : 10.

The cases of books per the "*Ellenborough*" shall have our attention, they have just been received.

The books ordered in your letter of the 3rd February for the Society are not all of them procurable. No. 1 of Gray's *Spicilegia Zoologica* is only just published. Leach's *Zoological Miscellany* cannot be heard of, and we suppose it to be an American publication, it will be obtained if possible. "Andubon's Ornithology," &c. is not yet published. "Gray's Genera of Birds," will be sent with the part of his other publication, by the next ship, and will be delivered to you by Messrs. Thacker and Co.

We are, Sir,

Your most obedient Servants,

W. H. ALLEN & Co.

It was determined that under the circumstances, the Society would receive the map; and the Honorable the President intimated, that upon his arrival in England, he would forward to the Society, a first rate recent map. The special thanks of the Society were voted for this very liberal offer.

Read the following letter from Captain D. WILLIAMS, Assistant Commissioner, Arracan:—

Ramree, June 12, 1843.

MY DEAR SIR,—I beg to return my best thanks for the Birman Code of Law; it appears to be a collection of cases for easy reference; the Dammathul is a voluminous code, and is not to be obtained, I believe, complete in this province. It is arranged under distinct heads, has every other mark of being a genuine Code of Laws, and the Mugs have a great partiality and reverence for it. Seldom would they transgress it even for their advantage: for instance, mortgaged lands are surrendered to emigrants in this district after 40 and 50 years' absence, so sacred do they consider their law on this head, and they could evade it by coming into our Courts, as we give a contrary decision, by which they would keep possession: they have no Limitation Laws in such cases.

I have sent to Chedooba for the coins, and when I have received them, I will have great pleasure in sending you for presentation to the Asiatic Society two coins. There are eight in a good state of preservation, and many pieces, four of the former I



must send to Lieut. Phayre, the Assistant Commissioner at Sandoway, according to my promise.

Lieut. Phayre is a good Birman scholar, and his information regarding the "Dummasat" would be very valuable to you. He is now compiling a list of Kings of Arracan of the Mug dynasty, and of Governors of the Province under the Birman rule, from a valuable collection of coins in his possession; its perusal will no doubt be enjoyed by your Society.

I forward to Lieut. Phayre, the copy of the Dummasat and your letter, requesting he will communicate to you his opinion.

• Your's truly,

D. WILLIAMS.

Read the following letters from the Secretaries to the Government of India and Bengal :—

No. 682.

From the Secretary to the Government of India, with the Governor General, to Secretary to the Asiatic Society at Calcutta.

Foreign Department.

SIR,—Under instructions from the Right Honorable the Governor General, I do myself the honor of placing at the disposal of the Asiatic Society, the accompanying Report from Captain Graham, on the Manners, Customs, &c. of the people of Shoa, and an Historical Account of the Abyssinian Church by the same gentleman.

2. As these documents are originals, I have to request that you will be good enough to make them over when done with, to the Officiating Secretary at the Presidency Office, for record.

I have the honor to be, Sir,

Your most obedient Servant,

J. THOMASON,

Allahabad, 13th June, 1843.

*Secretary to the Government of India,
with the Governor General.*

No. 575.

From Under-Secretary to the Government of Bengal, to H. TORRENS, Esq., Secretary to the Asiatic Society.

SIR,—I am directed to transmit the enclosed Report by Capt. G. B. Tremeneheere, Executive Engineer, Tenasserim Provinces, of a Visit to the Paekchan River and some Tin localities in the Southern portion of the Tenasserim Provinces, together with a Sketch which accompanied it.

2. The Military Board, in forwarding the above Report, have intimated, that the specimens of Tin therein referred to, will be forwarded by Captain Tremeneheere, when received, to the Curator of the Museum of Economic Geology.

I am, Sir,

Your most obedient Servant,

A. TURNBULL,

Fort William, 5th June, 1843.

Under-Secretary to the Government of Bengal.

Mr. Piddington presented a paper for the Journal, being a translation of (with remarks) M. Stanislas Julien's remarks on the study of the Chinese



Language. He also exhibited the charts to his Eighth Memoir on the Law of Storms, (the Madras and Arabian Sea Hurricane of October 1842,) now in the Press.

The Librarian presented the classified catalogue of the European Books in the Society's Library, which is now printed, and for distribution to Members.

Mr. BLYTH presented remarks on the Zoology of the Tenasserim Provinces, which will be farther alluded to in his report.

Read the report of the Curator Museum Economic Geology for June.

Report of the Curator Museum of Economic Geology for the Month of June.

Geological and Mineralogical.—We have received here, through Messrs. Allan, Patton and Co. from Major Sleeman, as executor to the estate of the late Dr. Spry, three mahogany cases, containing a considerable number of Geological and Mineralogical specimens, with a few corals, &c. some of these are in a state of sad disorder from being separated from their labels or envelopes, and evidently tossed about in utter confusion. I shall however be able, I hope, to verify the localities of most of the Geological specimens. None of these are complete series or collections, (with the exception of a small set of specimens from the Fort boring,) but a number are rare; many will fill up blanks in our cabinets, or replace inferior specimens, and are thus most acceptable to us.

I have now finished collecting from the Hoogly opposite to Calcutta, and from Burrisal at the other extremity of the Delta, two bottles of water for each month in the year, to ascertain the quantity of silt brought down by the river. I propose, with the approbation of the Society, forwarding one set of these to the Geological Society, with a request, that part of the silt may be sent to Professor Ehrenberg for examination as to the infusoria which it may contain; a question of very high interest to us here, as well as to the scientific world at home.

I mentioned in my preceding Reports, that through Mr. Howe's kindness, we had been provided with a large assortment of the shales and mud thrown up by the Volcano of Ramree; these I have divided into eight handsome sets, as follows:—

Memorandum of specimens from the Mud Volcano of Kyook Phyoo, collected immediately after its remarkable eruption of midnight 6th and 7th February, 1843.

A.—A bottle of the mud taken in a boiling state from the crater.

B.—Half calcined mud, taken from the walls of the crater.

N. B.—In some of these specimens, fruits and seeds of the surrounding bushes are found half burnt, but not destroyed.

C.—Mud from the neighbourhood of the crater, ejected from it in the eruption.

D.—The same with grass, &c. enveloped in it.

E.—Mud indurated to shale, with veins of porcellaneous (*aluminous*?) earth and calc spar ejected from the crater.

N. B.—Thin plates of this calc spar found amongst the mud; the largest in the Museum of the Society being about 6 inches by 4, and evidently detached from the shale.



F.—Indurated and laminated shale, sometimes approaching to sandstone, ejected from the crater, sp. gr. 2.5.

G.—Red shale indurated to a sandstone, (probably from the heat under pressure,) ejected from the crater, sp. gr. 2.6.

A single specimen in the cabinet of the Asiatic Society is red at one end, grey at the other, evidently shewing that they are derived from each other.

H.—Burnt sticks picked up shortly after the eruption about the crater.

Besides keeping our own cabinet well supplied, I proposed, with the approbation of the Society, forwarding these as occasion may offer as follows:—

- | | |
|------------------------------------|---|
| 1. Hon'ble the Court of Directors. | 6. University of Christiana. |
| 2. Geological Society. | 7. Geological Society of Pennsylvania. |
| 3. Société Géologique de Paris. | 8. Academy of Natural Sciences of Philadelphia. |
| 4. Royal Cornish Association. | |
| 5. Sir H. T. De la Beche. | |

Museum of Economic Geology.—We have received from Lieut. Phayre, Sandoway, a set of clays from that place, six in number, and specimen of the best Tobacco soil, as also a porcelain clay from Bassein. His letter is as follows:—

Sandoway, May 5, 1843.

MY DEAR SIR,—I have the pleasure to send you a box, containing specimens of the clays and earths of this district. All the brick clays are from the immediate vicinity of this town. I send also a specimen of Tobacco soil from the best Tobacco district here. I am aware that you have formerly analysed Sandoway Tobacco soils, but do not know whether those were procured, as this is, from the most famous Tobacco land or not. There is no pottery of any kind made here, I am sorry to say.

The white clay is said to be that from which the well-known *Pegu* pottery is made; it was brought from Bassein. Will you have the goodness to apply on board the *H. C. S. Amherst* for the box to your address.

A. P. PHAYRE.

We have also received from Lieut. H. C. Mayne, Adjutant 4th Nizam's Horse, specimens of the salt of the Loonar Lake, with the following letter:—

Mominabad, May 26, 1843.

MY DEAR SIR,—In reply to your letter of March 22nd, I beg leave to forward for the Museum Economic Geology of India, a specimen of the salt of the Loonar Lake.

You will perceive that the specimen is composed of three distinct species of salt. Large incrustations of this are left all round the edges of the lake, caused by the quick evaporation of the water by the sun, and partly from the foam of the wavelets as they beat on the shore.

The situation of the Lake of Loonar, is about midway in a direct line from Jaulnah to Hingolee, longitude about $76^{\circ} 45'$, latitude about $20^{\circ} 1'$. Hoping that this may prove an addition (however small) to the Museum, I shall use my endeavours to procure for its use, any interesting and curious specimen that may come within my reach, but not being a scientific character, I may be excused if I ever forward specimens, &c. which the Museum may already possess, or of so common a description, as not to be worth having.

H. C. MAYNE,

Lieutenant, Adjutant 4th Nizam's Horse.

P.S.—I have dispatched the piece of salt by this day's banghy to your address."



It is fortunate that we have in Dr. Voysey's Notes, a capital account of his visit to this very curious spot, with a sketch. It is too detailed to insert here, but will form an early paper in the Journal. Lieut. Mayne, in his chit alludes to common salt, while Dr. Voysey says, that merely traces of it were found in the water. It is evident from the specimen on the table, that common salt exists at the bottom of the lake, as well the carbonate of soda. From what Dr. Voysey says, it would appear that he visited it when the water was near the highest point, in July, and the fresh water would then lie above that impregnated with saline matters.

Having to call upon Mr. Weaver, the statuary, I requested of him the favor of sending to the Museum any fragment of marbles which he might have. He has sent us some, and in addition to them, a few very handsome specimens of petrified wood and tubicolæ dug up at Sheerness dock yard, which are a very welcome addition to our Geological and Mineralogical cabinet.

A very pretty collection of mostly South American Birds, the property of Sr. Apparuti, was exhibited for purchase. No price having been fixed, it was determined to offer for it the sum of Co.'s Rs. 150, as being one containing specimens, nearly all of which were acquisitions to the Museum.

For all the foregoing presentations and contributions, the thanks of the Society were ordered.



JOURNAL

OF THE

ASIATIC SOCIETY.

Report on the Manners, Customs and Superstitions of the people of Shoa, and on the History of the Abyssinian Church. By Captain GRAHAM, B. A. from the Secretariat of the Government of India.

From Captain W. C. HARRIS, Engineers, late on a Mission to the Court of Shoa, to J. P. WILLOUGHBY, Esq., Secretary to Government of Bombay, dated 8th May, 1843.

SIR,—I have the honor to forward the accompanying able reports by Captain Graham, on the Manners, Customs and Superstitions of the people of Shoa, and on the History of the Abyssinian Church.

2d. These reports complete the information which was required by the instructions that I had the honor to receive from you.

I have the honor to be, &c.

(Signed) W. C. HARRIS,

*Capt. Engrs. late on a Mission to the Court of Shoa.
Bombay, 8th May, 1843.*

Report on the Manners, Customs and Superstitions of Shoa.

The last known tale of a plausible adventurer in this country has been wrought up with the most meretricious tinsel to serve a specious design on this country of the Christian savage, but all works, both ancient and modern, have succeeded in casting a film over the eyes of the deluded public, which honesty loudly calls out to withdraw. The king of

of Shoa indeed forms an exception to most of the sweeping vices which disgrace the land, and his master of the horse has imitated his laudable example; both have been blessed with natural endowments, which in a more favored country, would have thriven to maturity, but sad though the truth may be, after months' wearisome endurance and patient research, there is to be found no third individual to add to the limited number of the praiseworthy.

2d. The nation is priest-ridden and bigotted to a degree. The most ridiculous doctrines must be believed, and the most severe fasts and penances must be endured, according to the pleasure and fiat of the church. Twelve thousand clerical drones, "*Fruges consumere nati*," fatten in idleness on the labour of the working classes, and even the sites of their habitations tend to rivet the chain of bondage, which encircles the neck of the infatuated Abyssinian. On the very summits of the ranges, stand the churches and the monasteries high over the vales, and perched among the few remaining groves, dotting the cool shady peaks, and far elevated in their pride of place, above the residence of the common herd. The priestly intimation is received with more attention, issuing from a temple, shrouded from human ken in the thick heavy fog, and the thunder of excommunication is listened to with utter abasement and prostration of spirit, proceeding from the grand scene of elementary strife, and falling upon the ear of the awe-stricken serf, amidst the prolonged echoes of the confirming thunder of heaven.

3rd. The king however, has lately taken upon himself to proclaim by the voice of the herald, and the beat of the drum, those doctrines which *he* conceives to be most conducive to salvation, and by the summary deposition of the refractory spiritual chiefs, and confiscation of their property, he bids fair in time to promulgate a most curious religious code of his own, if not upset by a civil war, which may blaze out in consequence of his innovations.

4th. The land swarms with monks and anchorites, who are clothed in yellow dresses, or in the prepared skins of the antelope, and who, from the licentiousness of their manners, roam through the country a perfect pest and plague to society. Men become monks at any period of life. The rich deliver over their property to their children, who are bound to support them until their death. The poor live upon the

bounty of the community, and many never enter the huts of the monastery, but with their wives reside at ease in their own homes, having joined the order for the mere sake of defrauding their creditors; for however deeply involved, the donning of the head dress, and the monastic habit clears off all former scores, with the ease and rapidity of the most indulgent court of insolvency.

5th. The skin of the (algeazine?) is adopted as a dress by all who cover under the garb of humiliation a deep-rooted pride of their institution, and together with the unwashed person is meant to commemorate the legend of their great founder, Istathios, who boasted of no ablution during a long term of existence, and who miraculously crossed the river Jordan, floating secure upon his greasy skin. The prophet Samuel is also sometimes referred to, as affording another example of the advantages of the covering of hide, and the story relates, how he sailed in company with his disciples for seven days' journey on the surface of a great sea, borne in safety upon the leathern robes which formed the only mortal attire in those ancient days.

6th. Although monasteries are rife over the face of the country, yet the mountain Azzulo, situated near the river Hawash, is celebrated as the most sacred seat of monkery. The mountain continually emits dark smoke, and its only inhabitants are Christian fathers, who despising the world and its vanities retire thither, unmolested by Galla or Mahomedan, to spend their days in blissful peace and retirement, universally looked upon and feared as sorcerers; they are said to live on the most social terms with the lions and wild goats which abound upon the hill. The reception of youth as novices is by no means sanctioned by the monopolizing elders, to whom the tale assigns an exclusive subsistence upon the fruits and herbs and roots, which together with a pair of wings, are freely furnished them from heaven; but none of those who have as yet returned from the pilgrimage are stated to have brought back their feathered appendages, and the lank figure and dim eye betoken rather the toil of the weary wayfarer than the high enjoyment of Elysian feasts.

7th. The small encircling cord of silk round the neck, called the "Matab," is the emblem of the debased Christianity which exists throughout the land, the color is deep blue in reference to the smiling sky of heaven, and the turban of the priest and the monk is designed

to commemorate the event of Moses covering his face on the mountain of fire, when receiving the tablets of the law.

8th. Uncharitable and uncompromising, the dread anger of the Church often blazes forth into the furious blast of excommunication, and the souls of men are consigned to perdition for the most trifling offence.

9th. The bell, book and candle, can be hired by any disappointed enemy, and the hooded priest can be purchased to perform the ceremony, but the question in some cases is not without difficulty and danger to the officiating clergy, especially when sacred majesty is concerned, or where the sturdy sons of Europe come under the ban of the Shoan Church. The cells of the state prison often enclose the fanatic priest, whose want only interferes with the royal salvation; indifferent fare and close confinement ensure an absolution, and the martyr to religious intolerance is expelled from the country.

10th. The *argumentum baculinum* is the only other antidote, and possesses a wonderful effect in stilling the storm, when persuasively applied to the shoulders of arrogant Church pride.

11th. On the latest occasion of the ceremony being performed upon the fair sons of the North, the priest was quietly laid hold of, and introduced into the interior of the domicile, where his countenance considerably drooped at the sight of an unwelcome host just arrived with a most formidable cudgel. "My father must have been mistaken," was the opening address which saluted his astounded ear, whilst the cudgel descended upon his shoulders with an equally startling salutation. "My father never could have purposed the excommunication of his dear friend," followed the exordium, and the cudgel again pattered upon the priestly back; a most able running commentary was sustained for nearly five minutes, attended by many playful taps upon the head to quicken the clerical understanding, and on the termination of the conclusive argument, the priest willingly withdrew his ban, bestowed his entire absolution and sneaked away to his cell, mentally resolving never again to interfere with those most incomprehensible Europeans, who displayed so little terror at being cursed by the Church, and who entertained no respect whatever for the sacred persons of her ministers.

12th. The Negus, however, is the true God of their adoration, and the essence of this devotion pervades the band to its very core. The best

portions of the country pertain to His Majesty ; the lives and property of the subjects are entirely at his disposal ; every act is performed with some view to forward his pleasure ; and all wait on his sovereign for favor, preferment and place. Mild, however, and just in his disposition, he is universally beloved in his own dominions in which the oath is by the life of the king in the land, wise and warlike in his expeditions, he is feared and respected among all the adjacent tribes ; conducting himself with that easy freedom which generally distinguishes conscious superiority, his demeanour is kingly and commanding, and his character for impartial justice has obtained for him far and wide, the enviable cognomen of " the fine balance of gold."

13th. Here the precious metals form the exclusive privilege of royalty. Personal ornaments and colored raiment are prohibited to the subject by the severest sumptuary laws, and few, except the highest chiefs and warriors of the land, are ever honored by an exemption from the rule. All the appointments in the country are at the king's disposal. All rewards and favors come from the royal hand in years of famine. Food itself is only to be obtained from the royal store houses, and it is therefore by no means surprising, that the population should be mean, cringing and servile ; that they should in their aspirations after honor and place, submit every action of their life to the despot's will, and in their present benighted social condition, even bring their wives and daughters to pander to the despot's pleasures.

14th. But Sabela Selassee is an unique specimen of absolute power, and the iron sceptre falls light from his merciful hand even on the head of the offender. His virtues are many and conspicuous ; his faults entail harm chiefly upon himself ; and the expenditure of the greatest part of his hours might be held up as a worthy pattern for imitation for all.

15th. After religiously performing his devotions early in the morning, he inspects his stables and workshops, bestows charity on the assembled poor, despatches couriers, and gives private audiences of import, and afterwards reclining upon his throne in state, he listens for hours to all the appeals from his subjects.

Here access is easy. The king listens to all foreigners and subjects, men or women, rich or poor ; every one has a right to appear before him, and boldly to explain the nature of his case, and although established

custom obliges the subject to prostrate himself, and pays rather adoration than respect, yet every complainant may tell his story without the least hesitation or timidity. Judgment is always prompt, and generally correct. At three o'clock His Majesty proceeds to dine alone, and after the royal appetite is appeased, the doors are thrown open, and the long table in the great eating hall is crowded with the most distinguished warriors and guests; harpers and fiddlers perform during the entertainment, and singers lift up their voices in praise of his magnificence and liberality; but the king during all this scene of confusion and turmoil, still continues to peruse letters and issue instructions until the table has been three times replenished, and until all of a certain rank have freely partaken of his hospitality. At 5 o'clock, he retires with a few of his choice friends to the private apartments. Prayers and potent liquors pass away the evening hours, and the company depart, leaving only the favorite page to convey to the inmates of the Harem, the royal commands.

Midnight calls his Majesty from his couch to the perusal of psalms and holy writings; a band of sturdy priests in his immediate vicinity during the live-long night continually chaunt a noisy chorus of hymns, to preserve their master from the influence of evil spirits and bad dreams, and daylight brings a repetition of the busy exercise on horseback, when business or the fickle sky will permit.

17. The nation displays a strange medley of good and evil, mildness and cruelty. Superstition, religion and fanaticism in venerating the sovereign, and dealing out largess to the poor. They are drunkards and liars of the first magnitude, and their minds being insensible to the charms of exalted virtue, they are restrained from evil deeds by no moral influence whatever. Kind to their animals, slaves and females, they practice every species of barbarity upon their enemies, and are perfect fanatics in their religious creeds which are of the most subtle nature. They are fiercely arrayed against each other in hostile sects, and are only prevented from carrying on war to the knife, by the local difficulties which separate the parties. Easily irritated, their anger blazes up into a fierce flame of passion, but like the crackling thorns, it is soon expended; dull in comprehending a joke, they delight in the broad antics of the court buffoon; and violent and litigious in their private dealings, they are still not disposed to carry their wrath to extremity, or to allow amongst

each other the brutal feelings to exercise an entire predominance, restrained by the wholesome law of blood for blood, and life for life.

18. The principal men of the country who are not entrusted with government, spend their time in utter idleness, lounging about the purlieus of the court, or gambling for hours at the game of *gibbeta*, leaving the management of their houses to their women, and the direction of their farms to their servants and slaves. All, however, end their day at 4 o'clock, when the king's table is thrown open to men of rank, and when the king's potent hydromel very soon incapacitates them for any further thought or deed. The most slovenly appearance marks the interior of their houses, and dirt and filth choke up the surrounding enclosure. The furniture is confined to a rickety bedstead, a bullock hide, and a small wicker table; the necessary wood fire in the centre of the solitary apartment blackens every article within the walls with a thick crust of smoke, presenting a most gloomy vista on entering the doorway, and the universal objection to the use of water, either as regards their person or clothes, renders the foul tableau still more disgusting.

19. Water as well as coffee and tobacco are studiously avoided, as savouring too strongly of Islamism, and the Christian inhabitant contents himself with rubbing his eyes in the morning with the dry corner of his dirty robe, and pouring a stream of rancid butter over his matted locks.

The dress of the men, from the king to the peasant, consists in a large loose robe of thick cotton cloth, enveloping the body in graceful folds; but nearly incapacitating the wearer from any great exertion on foot; frequently disconcerted and falling upon the ground, the wearer is every moment obliged to tuck up this most troublesome garment, and fold it anew about his body; a cotton waist cloth of many yards encircles the loins, and a pair of very wide trowsers hanging barely to the knee, sum up the ordinary toilet; although during journeys and expeditions, the skin of some wild animal fashioned somewhat into the form of a cloak is worn over the shoulder.

20. All carry a short crooked sword bound tight on the right side, which requires constant oiling, and some portion of personal strength to extract from the sheath; and entertaining a wonderful affection for the stick, no man ever stirs from the house, either mounted or on foot, without the long thin wand. Too lengthy to be of any use in urging on his animal, and too thin to support any weight as a staff, the inconveni-

ence is endured to keep the hand in constant practice for carrying the beloved spear. The clergy are more sensible in their predilections, and their stout staff with an iron crutch as a handle, is a very laudable instrument indeed, either for support or offence.

21. The men scrupulously denude their cheeks and chins, in the absence of the razor clipping with a pair of very indifferent scissors all the hair close to the skin, and thus adding very considerably to the dirty appearance of their unwashed faces; but the greatest attention is paid to the management of the hair, with which nature has most liberally supplied the head, and many hours are daily expended in dressing the mop into many and quaint fashions. It is sometimes worn hanging in long clustering ringlets over the cheeks and the neck; at other times frizzed into rounded matted protuberances, which are studded over the greasy block, often fancifully tucked and trimmed into small rows of minute curls like a judge's wig, and again boldly parted into four large compartments like jelly moulds, but always reeking with rancid butter, and exuding a most disagreeable effluvia.

22. The clergy wear a high white cotton head-dress and black woollen cloak, with coloured emblems of the faith attached in every direction for public view. Treated with highest respect and veneration, they are always addressed as Father, caressed and fed wherever they choose to turn their footsteps; all the natives fully believing that the kissing the hand of one of these dirty shepherds, purifies the body from every sin.

23. The colour of the Abyssinian race varies from a bright copper to the deep jet black; the men are by no means particularly handsome, but the features of the women are of an inferior and more disagreeable contour than those of most nations in the world. Small eyes and flat noses are added to high cheek bones, low foreheads and a broad expanse of countenance, and their attempts are exceedingly ingenious to render more hideous the uncomely appearance which nature has thought proper to bestow upon them.

24. The eye-brows are totally depilated, and a deep narrow line painted in their room with a strong permanent blue dye, bestowing a more than ordinary look of foolishness, whilst the cheeks of the high-born dames are plastered to the very eyes with red paint and fat; the hair is also either cropped, frizzed and besmeared with tallow

into a most frightful consistency, resembling in appearance and size an ordinary English bee-hive, or the bare shaven head is encircled by a narrow dirty fillet; and their feet, naked and exposed to all seasons and weather, become hard, horny and mis-shapen.

25. Their only dress consists of a large wide sack chemise, bound round the waist by a thin rag, and a long sheet thrown over the head descending to the heels, which like Ruth's veil is very coarse and strong, and fully capable of containing six measures of wheat. Their ornaments are large black wooden studs in the ear, which on holidays are replaced by masses of pewter resembling the teething rattles employed in nurseries; pewter bracelets and anklets, together with a profusion of blue and gold colored beads are worn by all who can afford the outlay, and the dirty toilet is not complete without a stream of rancid butter upon the hair, and the nostrils securely plugged up with lime peel or sweet herbs, leaving the end of this strange nosegay dangling over the wide mouth. They soon ripen and grow old, girls becoming mothers at the early age of twelve; but like the fruit of the medlar, they are rotten before the summer of life has well commenced.

26. All classes are most pertinacious beggars, every thing seen is demanded; knives, scissors, beads, cloth, looking glasses and dollars; the love of acquiring property stifles every sense of shame, and they feel no compunction in asking for the cloak off your back, or of carrying it away, even during a heavy storm of rain; they even take a pride in this national feeling, and say, that an Abyssinian child will stretch out its hand to receive a present before it be born; and their tradition hands down as most praiseworthy the conduct of one of their great chiefs, who on his death-bed desired his body to be buried in the track of a caravan, that if possible his spirit in the future state might be in the way of receiving a toll from the passing merchant.

27. Warm butter mixed with honey and the seeds of the *hubbesh*, is given to an infant immediately on its birth, and circumcision follows on children of both sexes on the seventh day. The operation, performed generally by an old Galla woman, is exceedingly painful, and is often followed, especially in females, by the most serious consequences in some districts. A male child is carried in the hands of men to the Church on the fortieth day, and a female is borne by

women on the eightieth, when it is christened after the Abyssinian ritual. The right of bestowing the name upon the boy belongs to the father, whilst the mother exclusively chooses one for her daughter. A grand entertainment to the priests finishes the ceremony, and the bearers of the infant to the church are considered its Godfathers and Godmothers, and are expected to treat the child with all affection during the scenes of after-life.

28. Invariably it is carried tied up in a bag at the mother's back until it can walk; the cramped confinement seemingly produces no evil result upon the symmetry of the child, and the extra burden interferes but lightly with the severe labour which in this country is the lot of the hard-worked female.

29. Education is at a very low ebb indeed, and those children are alone instructed in the rudiments of learning, who are intended for the service of the Church, or for the priestly office. The five churches of Ankobar have each their small quota of scholars, but the amount altogether does not reach 80 out of a population in the capital of 8,000; the remainder run loose and disorderly like wild colts, until the season arrives when they are caught to be employed in drudgery.

30. After the age of 5 or 6, they are employed as servants, and set to work in the fields, and to fetch wood and water for the family, and the greater part at the age of 12 or 14 forsake the paternal residence to seek a livelihood in the service of the king or the great men, and as their pittance is but scanty, they can save nought from their wages, and are thus forced to remain in servitude during the residue of their existence. The favorite son remains with his father; begins to have some authority in the management of affairs about the age of 15; then chooses for himself a wife, and engages in the usual avocations of tilling the ground, repairing the house, and attending the king's military expeditions.

31. A girl is reckoned, according to the value of her property; and the heiress of a house, a field, and a bedstead is certain to add a husband to her list before many suns have shone over her head. In Shoa, marriage is generally concluded by the parties declaring before witnesses, that by the life of the king, they intend to live happily together, and the property of each being produced is carefully valued. A mule



or an ass, a dollar, a shield and some spears on the one side are noted against the lady's stock of wheat, cotton and bedstead; the bargain being struck, the property becomes joint for the time, until some quarrel ensues, when each taking their own, depart to seek fresh mates.

32. Men and women eat together at the same table, and most affectionately pick out the choicest morsels from the common dish, and stuff them into each other's mouths at arm's length. The appearance of the large foolish black face bending over the table, with the wide gaping mouth to receive the proffered tit-bit of raw flesh, which from its size requires considerable strength of finger to cram into the open aperture is sufficiently ludicrous, and brings forcibly to the recollection the nest of toad-like sparrows in the garden hedge at home gaping to the wanton whistle of the truant schoolboy. The meals are generally taken twice during the day, once at noon and again after sunset.

33. There exist two sorts of marriage, the one before-mentioned, and another which is celebrated by the Church somewhat in a similar fashion to our own; the parties swearing to take each other for life, in richness and poverty, sickness or health, which is ratified by partaking together of the sacrament, and by the usual oath of the country, the king's life. The inhabitants of Shoa, however, do not relish this fast binding, and the ceremony is seldom requested or performed.

34. Favorite slaves and concubines are equally respected as wedded wives, and there is no difference between legitimate and bastard children. The example set by the monarch, who in addition to his lawful spouses, entertains upon his establishment upwards of 500 concubines, is followed by all who can afford the expense; and the wandering life of the court renders the system of concubinage more agreeable, and less expensive, than the continual movement of legal wives and families.

35. The king dwells only for a time at one palace, and then proceeds to another at some distance, accompanied by all his chief officers, courtiers, and domestics. Fresh female establishments are invariably entertained at the new station; all conjugal affection is lost sight of, and these women being in time cast aside in neglect, as well as the forsaken wives, proceed in their turn to seduce the young men, and thus profligacy reigns paramount among all classes of society. There are

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indeed few couples who live any time together without violating the conjugal bed, the matter not being particularly regarded, and a beating being the only punishment inflicted upon the offending party.

36. Lost to all sense of shame, many of the libertine inhabitants keep their wives and concubines under the same roof, the favorite for the time being having all authority over the rest, who submit in the meekest manner without repining to the thralldom of the degrading situation. Nay, they even declare, that it is better to have some one to talk to, even though she be the supplanter of affection, than to remain solitary in a lone house by themselves; nor are these grovelling sentiments to be much wondered at, when we consider that the jewel, chastity, is here as pearls before swine, and that the utmost extent of reparation to be recovered in a court of justice for the most aggravated case of seduction is but five pennies sterling!

37. Morality is indeed at the very lowest ebb, for here there is neither custom nor inducement to be chaste, and beads, more precious than gold, bear down every barrier of restraint; honesty and modesty both yield to the force of temptation, and pride is seldom offended by living in a state of idle dependence on others. The soft savage requires but little inducement to follow the bent of her evil passions according to the dictates of unenlightened nature, and the rules of the loose society form no obstacle whatever to the entire gratification of her vicious desire.

38. Christian only in name, the nation is plunged in a filthy quagmire of bestial indulgence, and is stiff-necked and puffed up with the most inordinate self-pride. There is little chance of their benighted minds receiving voluntarily one single ray of good to enlighten their spiritual darkness. Founding every hope of salvation in the preservation of weary fasts, in the performance of vain ceremonies, and in the belief of ridiculous doctrines, they consider that faith in the true word is but an empty sound, and that kissing the stones of Jerusalem availeth rather than all the good works which can be compassed during a long lifetime.

39. Death closes the weary scene of barbarous licentiousness, and is met with the usual stoicism of the savage. On the demise being fully ascertained, the body is washed with warm water, and wrapped up in sundry cotton cloths according to the wealth of the family, the amulets and *mahtah* of the deceased are also immersed in liquid, and being

restored to the body, all are carefully enclosed within the folds of the cloth, and secured by several new cords ; then commences the frantic shrieks of the women, and the cries of the female mourners, which are of the most melancholy and distressing description, the low moaning dirge of the old women being interrupted at intervals by the hysterical sob of the principal sufferer, who is bereft of all she held dear upon earth. For a time grief is most extravagantly indulged, the cloth is torn in shreds from the bosom, and the skin plentifully scarified from the temples, whilst the moaning and wailing continue, and group after group from the neighbouring houses pour in to add their voices to the dismal coronach, which swells on high from the death hut, and incite by their ejaculations, fresh bursts of lamentation from the survivors.

40. The corpse is then carried to the grave, which varies in depth from two to four feet, and is buried with the feet towards the East, that on the resurrection, the face may be towards the rising sun. A feast to the relatives concludes the ceremony, and the dirge of mourning gives place to the notes of the violin, harpers and fiddlers generally accompanying the funeral procession of all great men, and using their utmost endeavour to entertain the returning party by their liveliest airs. Should death occur during the night, the priests are instantly called to the scene, and by the blazing light of the torch prayers are chaunted until morning for the soul of the deceased ; but on ordinary occasions, the body is carried to the cemetery half an hour after the departure of the breath.

41. A small quantity of *loban* is often deposited in the grave, together with the book called *sefafa zedick*, and the kings alone are honored with coffins manufactured of wood perforated with many apertures ; these are placed on stone trestles amidst clouds of frankincense, and kept in this situation until the body becomes dried up, when the coffin is removed into the mausoleum, the walls of which are generally bedaubed with pictures, intended to represent the hunting and military actions of the royal occupant.

42. Priests alone possess the right of interment on the eastern side of the church, four paces from the porch. The aristocracy occupy the North, and warriors, women and children the South and West. All who die of *syphilis*, without confession or absolution, are either interred by the wayside, or in unconsecrated ground. Governors, men

of rank, and all wealthy commoners who have not, during life, worked in wood, iron or precious metals, are covered in the grave with the green branches of juniper; but smiths and artificers being looked upon as sorcerers, every care is taken to keep them under the ground when once deposited; great stones being heaped over the body, and the earth well secured and trampled afterwards under foot.

43. The funeral of an individual of reputed sanctity is attended by numbers of the priesthood with the great umbrellas of the Church, wherein the corpse is placed for a time, and surrounded by twelve lighted tapers betokening purity of life, which when nearly consumed are, lowered with the bier into the sepulchre. Ecclesiastics occasionally enjoy the privilege of a last resting place within the precincts of the sacred edifice; the pall consisting of a piece of printed Surat chintz is supported by six bearers, who wave it alternately with a fanning motion, whilst a numerous train of mourners follow amidst loud wails, with their hands clasped behind the neck, in token of the triumph obtained by death over sin.

44. During forty days, requiems are daily chaunted for the soul of the departed, and charity in proportion to the estate left, is distributed both on the day of interment and on several succeeding anniversaries. Oxen and sheep are freely slaughtered at the *tes-car*, or funeral feast, and all who choose to attend receive their portion in honor of the deceased.

45. Black or yellow garments, or ordinary dresses steeped in mire are worn indiscriminately as weeds—the period of mourning extending to one year; and on the death of a friend or relative, male or female, both sexes scarify the temples by removing a circular piece of skin, about the size of a sixpence from each, with the nail of the little finger, which is purposely suffered to grow like an eagle's talon. This custom, borrowed like many others from Judaism, is generally practised throughout the kingdom; scarcely an individual being free from the disfiguring scars, although in opposition to a royal interdiction, which was proclaimed throughout Shoa, in consequence of an ecclesiastical remonstrance to the throne, representing the custom to be in direct violation of the written law: "Thou shalt not cut thy face for the sake of the dead."

46. Although three military expeditions are undertaken every year, the nation is by no means either a martial or a chivalrous one. Few

individuals are pointed out as being possessed of even common bravery, and the high honor and esteem in which they are held, evince the absence of this virtue among the rest. The principle of bullying the weaker party may be distinctly traced in every form and relation of life, and much of the mean subserviency and respect of the inferior may be justly attributed to the well-known consequences of arousing the dread anger of the superior.

47. Their system of war is entirely predatory, and consists of successively overwhelming with immense masses of men solitary tribes in the vicinity, taking the unsuspecting foe by surprise, massacring all the males of the family; sweeping off into captivity the maids, widows and cattle; and utterly burning and devastating fields, houses, and farm stock: but there is seldom any fighting; the unfortunate Galla is taken completely unaware; those who have swift horses at hand make their escape to their hiding places, and the unlucky remnant are shot down, speared and emasculated without mercy: a few only offering any resistance to the numbers who surround the devoted band.

48. A very different scene, however, presents itself when timely intimation is carried to the tribes of the destination of the locust army of the Amhara; the women and cattle are sent to the fastnesses, and the men assemble mounted on their light, active and well broken steeds. The invaders halt at the sight, for the courage of the Amhara is not sufficient to carry him into fair fight with an armed foe, and after a little skirmishing at a distance, the intruding numbers retire before the few, until some more favorable opportunity occurs of dealing the death-blow in the dark.

49. But the Gallas, from their better acquaintance with the localities of the country, oftentimes make the invader pay dearly for the spoil, and more especially when entangled in a morass these wild riders charge splashing through the swamp at full speed, and cut the bewildered Amhara to pieces. Whilst returning from a late successful surprise, His Majesty had the deep mortification on coming up with the plunder and rear division, to find his advanced guard nearly annihilated, and the bodies of 800 of his most distinguished warriors lying trampled in the mud as a bloody memento of the successful rush of the Pagans, who were lining the tops of the surrounding hills in utter derision of his remaining force. Many of the Galla tribes, also of the Loomi,

the Aroosi and the Ittoo, still hold their own, and have by repeated defeats, taught the Amhara to beware of the close conflict.

50. The spear, the sword, and the buckler, are the national weapons, although the use of fire-arms is partially known and fully appreciated, and the king's company of fusileers is gradually increasing in number, to his own advantage, and to the consternation of his enemies; but the habitual suspicions of the monarch prevents the native from being made thoroughly acquainted with the use of the firelock, the arms being always deposited within the walls of the palace, excepting during the actual period of the expedition, and ill-judged parsimony works its usual baneful effects on the minds of the hired soldier.

51. Combining the halberd with the javelin, the spear is used both for thrusting and throwing, loaded at the butt with a stout ring of iron; it is short, light, with a keen long iron head, and well balanced, but better adapted for launching as a missive weapon. The Abyssinian, from constant practice, is well versed in its use, and after poising it for a time over his head, displays considerable accuracy of aim at any distance within sixty yards of the mark.

52. It may be generally said, that swords of civilized nations are straight, whilst those of barbarous people are curved. The Abyssinian implement, which is frequently represented in old Egyptian paintings, is very short, hardly two feet in length, very highly recurved, and fashioned out of very bad metal indeed; altogether it is a most ridiculous weapon of war, and would prove of but small service, if opposed to any of the modern inventions. After the fashion of the ancient Persians and Romans, it is worn on the right side, and is more like a short reaping sickle with the back sharpened than a sword; it is chiefly employed after the spear has finished the work of death, to complete the work of mutilation of the body.

53. The terrible effect which attended these weapons in ancient times is not to be witnessed among the dastard sons of Shoa. "The horseman indeed lifteth up both the bright sword and the glittering spear," but "there is no multitude slain," and if beat into ploughshares and pruning hooks, the metal would prove of much greater service to the nation in their agricultural pursuits, and of equal avail in braining a defenceless Galla, their only enemies acquainted with the art of war.

54. The buckler, resembling the Roman clypeus is made of a good tough bull's hide, or cut from the hardened skin of the wild buffalo; it is of large dimensions and well studded with silver and brass crosses and ornaments, and being conveniently portable, can be turned with the greatest ease to ward off the threatened blow of the coming missile. Anointed and rubbed with oil, as a preservative against cracking and injury from the weather, this defensive armour is generally stowed in a cotton bag, and on the return of a triumphant army, is frequently presented as a votive offering, and hung on the vestibule of a church. When not worn on the arm, it depends from the high pommel of the saddle, and "the bull skin border of the bossy shield" protects the leg from all the crushing and kicking, invariably experienced in the disorderly array of the Amhara rabble.

55. The troops move in masses under their respective governors and leaders, and take any direction they choose, provided they do not interfere with His Majesty's particular route, or go before the state umbrellas. The king's concubines and women follow on mules immediately behind their lord and master, and a band of 30 bearers of the royal silver shields preserve the faint line in front of the confused mass of succeeding horsemen, who are kept from intruding too near the sacred person of Majesty, by the strenuous efforts of the master of the horse and his assistants, who lay about lustily with their ratans, without much regard to rank or station.

56. The striking of the royal suite of tents, which is pitched enclosed in a compound of black woollen walls, is the signal for packing up, and at the beat of the drum and the sound of the horn, the king, bare-headed as Masinissa of old, issues forth about 9 o'clock, when the mass follow in his route. On His Majesty's dismounting to proceed on foot across the meadows, all follow his example; the march is seldom very lengthy, and the household ladies' alighting from their mules is the signal for the halt; a general rush at speed takes place from all directions of the host, for the purpose of securing a good grassy spot for the bivouac, and fierce wrangling, and often times quarrels and bloodshed ensue, before the array is quietly located for the night. None have tents except the king and a few of his great governors, and like the black woollen awnings of Kedar, they are warm and of a close texture, and are kept firmly erect by loops fixed to hooked wooden pegs.

57. His Majesty is welcomed to the capital by a strain of triumphant music from every throat in the army, whilst all the successful warriors decked out in their gayest attire, and vaunting trophies dangling beneath gauntlets and bracelets of silver, careering in front, slowly progress before the royal person in a mazy labyrinth of reticulated circles. The air is rent with shrill whoops and yells, which are answered by the thrilling welcome of the women pealing from the palace and every part of the town, whilst the thundering war song is shouted from the dense phalanx closing the procession.

The priests receive their royal master with a blessing, and the unceasing clang of big drums, together with frequent discharges of musketry and artillery, fill up the pageant.

58. From the most remote ages, the glittering bracelet has been always the badge of bravery. The Amalekite, who slew the warrior Saul, took the bracelet that was upon his arm and brought it to David. In some parts of the East they are still used in the investiture of gallant chiefs; and the celebrated armlet of Persia surmounted by the great diamond "the crown of the moon," is not more valued by its royal possessor, than the ring of brass which encircles the wrist of the Amhara. The gauntlet, the spoils of the lion, the armlet and the *aqua-dama*, each advance the warrior in the scale of honor and credit, and when the matted locks are crowned by the white feather of the Hirkom, or the green sprig of wild asparagus, the most frightful tales of blood proceed in streams from the mouth, and there is no deed sufficiently daring for the prowess of the braggart. But it is well known, that many are ornamented who have never proved themselves in the field, even according to their own base ideas of fight. The lie is brought to the rescue of the coward reputation, and the emblems of bravery are often exhibited, on spilling the blood of the most inferior vermin; but blood is the sacrifice demanded, and it matters little whether it be poured from the veins of the Christian or the Galla, from the elephant or from the mouse; the war song is shouted on every available opportunity, even on the accidental destruction of a rat, and all would fain appear martial and chivalrous, glorying in the name of the "bravest of the brave."

59. The principal materials employed in the most ancient crowns and chaplets were wreaths of flowers and leaves, which were afterwards

substituted by imitations in metals. The idea of the *aqua-dama* might have been taken from the tendrils of a creeper hanging in clusters from a massive branch of the Weira tree, and the ornament is certainly deserving of much praise for its singular beauty and fanciful form. A transverse bar of worked silver worn across the brow over a thick row of ornamented pendants reaching to the eyes, and branches of light chains depending at intervals completely round the head, fall in a glittering mass to the waist, whilst a worked coronet rises high above the bar, and is profusely cut into open figures and highly wrought crosses.

60. The gauntlet is generally made of silver, and reaches from the wrist to the elbow, and the armlet is an unmeaning hollow ring of silver, resembling in size and clumsiness rather a manacle to secure a wild colt, than an ornament for a Christian man.

61. The travelling equipment of a man of rank is very simple indeed, and a few attendants or a sumpter mule suffice to carry all requisites for the journey. His wants are but few—a loaf of bread and a horn of mead for his sustenance, and a skin for his bedding; the cotton robe serves him for covering by day and by night, and he can always find some shelter at the end of the march, which is little inferior to what he had been accustomed at home.

62. Ambling along upon his mule gaily bedecked with bells and brass ornaments, with a running footman on each side, he takes the road early in the morning, followed by a party of retainers according to his means. Immediately behind his person, the confidential shield-bearer takes precedence, his steward rides nearly abreast to hold a share in the conversation, and the remainder of the train, some with load and on foot, but all armed with sword and spear follow, as they choose, a noisy motley group, without order or regularity. They are, however, attached to their master from long service and kind treatment, and in many ordinary transactions swear by his name, instead of that of the ruling monarch.

63. A stage of 25 or 32 miles is considered long, and indeed the high hills to be ascended, and deep valleys to be crossed, render it wearisome to traverse even that distance; the general pace is the common step of the mule, about 3 miles an hour, but when the road is level, the amble is increased to 5, and those on foot are accustomed to keep up with the mounted party. A saddled horse is often led in the train, a custom

handed down from the former generation, when the country was not in such a settled state as it is at present, and when the traveller was obliged to keep a weary and vigilant look out for parties of roving Galla, and to give battle on the moment, if the occasion required; but Sabila Salassie has wonderfully improved matters during his long reign, and now, if provided with the necessary royal permission, an unarmed man can pass through any part of the hereditary dominions of Shoa, without scath to limb or property.

64. As the king's guest, the traveller is in general treated with some degree of respect, which is, however, entirely owing to the despot's wishes, and the fear of consequences unbars the door of the house and throws open the stores for the consumption of man and beast; but a churlish reception would most probably await the unfortunate who travelled through the country without the king's permission; and a well-stocked purse, or a well-filled portmanteau, would not invariably produce a salutary effect, as the savage has always some plan or idea in abeyance, to obtain any curious article exposed to his admiring view, without the necessity of imparting aught of value in exchange. Under every advantage, and attended by the king's household officers, it is extremely difficult at times to obtain the most simple and necessary supplies, and force is frequently resorted to, to extract these articles for which the most liberal payment has been tendered beforehand; but there always exists along with the desire to acquire property, an innate dislike to part with aught the most trifling, and even among the higher classes, the small request of a stick or a spear is peremptorily refused to parties, who have heretofore loaded the ingrate with the richest imaginable presents.

65. A great man on coming to the capital if unprovided with a house of his own, is certain to find ready accommodation always with the inmates of any of the lower description of dwellings, who are all willing, for a trifling consideration, to remove their bullock hides, and allow the grand visitor the free use of the apartment, such as it is. They will also cook the victuals of the stranger and his followers, if of the same religious persuasion as themselves, and remain content with a very small remuneration indeed.

66. His Majesty, however, in general, has tents pitched for all great men, and liberally supplies them with food, both at his own table and in

the presentation of the '*Dingo*,' an established allowance granted from the royal kitchen, bread, mead and pepper, soup daily, and sheep and bullocks being occasionally distributed to upwards of a thousand people, who are on the list as masters of *Dingo*. Every stranger who comes to the kingdom is amply provided for, and indeed all who make their necessities or their wishes known on the subject, have no reason whatever to complain of any want of liberality on the part of the sovereign of Shoa.

67. From the excess of cultivation on the table land, there are few wild animals, except hyenas, hares and field rats; the death of an otter is considered a rare feat of prowess, and badgers are avoided as the 'devil's sheep,' and the few that burrow in the hills are viewed with very great distrust. Partridges and guinea fowl are hunted down with dogs placed on successive ranges, who, fresh from the nearest station, pursue the quarry the moment he finishes his fight, and very soon pick up the wearied bird. In the low country, the larger animals, elephants, lions, buffaloes, rhinoceros and many species of antelope exist in considerable numbers, and as each has a relative value in the scale of honor reckoned according to Galla heads, the brave warriors on the frontier do contrive, at lengthy intervals between, to compass the death of some.

68. A large body, consisting of several hundreds proceed on horseback to the cover, armed with every available weapon, and worry the animal to death according to the usual approved system of Abyssinian bullying, riding after him till he is brought to bay, and pouring showers of bullets and lances from a distance into his carcase on the first convenient opportunity; but these hunts are often undertaken without success, and seldom conclude without many fatal accidents. The valiant thrower of the first spear is entitled to the honorary reward from the king at the triumph at entry into the capital, which is attended by the same ceremonies and rejoicings as the advent of a successful military expedition against the heathen Galla. The elephant is reckoned equal to 40 Galla, the lion to 7, and all the other large animals to 5 Galla, killed in battle.

69. A good equestrian, and a tolerable marksman, His Majesty is in the habit of making Saturday excursions, attended by many hundred followers to some favourite retreat, where he remains for hours, shooting what the country chiefly affords, *i. e.* baboons, vultures and wild ducks;

but the Amhara has altogether a very indistinct idea of woodcraft. One of the chiefs burning with the desire to emulate the white men in the distinction of an elephant, lately proceeded to the jungles with a retinue of 1000 adherents, and a large party of the king's gun-men; but after fruitlessly spending a month in the covers, he was fain to return without having destroyed any thing of larger dimensions than a spotted monkey. Hyenas are suffered to multiply to a great extent in some parts of the country, owing to the superstition of the natives, who firmly believe that Jewish sorcerers descend from the mountains during the night, and transform themselves into the likeness of these foul animals, and that in consequence, there would be no good result in the pursuit.

70. The bulk of the nation is indeed decidedly agricultural, although it appears somewhat strange that the minds of the people are not more disturbed and upset by the continual military expeditions they are forced to make against the Galla. Probably the selfishness of the despot in appropriating the lion's share of the spoil has most salutary effect in checking innate restlessness, and the Abyssinian is taught in a rough school to understand fully, that there is more profit to be obtained from holding the plough than from wielding the sword, and it is certainly the fact, that when the foray is over, the war horse is turned loose in the meadow, and the partisan willingly applies himself, according to his means, as usual, to his peaceful avocations among the fields.

71. Mounting on the left side with the assistance of their spear, the natives when seated do not by any means ride well, though they do not very often tumble from their horses or mules, owing to the high fortifications of wood and leather which are built upon the saddle to protect the rider in front and rear; and although they can carry a horse at speed over bad ground, their seat is awkward and ungainly, and they have no idea whatever of easing an animal in his distress. Bitted in the most cruel and barbarous manner, they bear as heavy as lead upon the bridle rein, and no horse is ever five minutes in the hands of an Amhara without having his mouth pulled to pieces, and the blood streaming as the tortured animal tosses his head in the air for relief.

72. The sojourner in Abyssinia can easily believe what Bruce relates concerning his recorded instance of cruelty to animals, for although it is not fair to brand the nation with a foul stigma resting on a solitary fact, yet there is no good reason to disbelieve the veracity of the traveller;

and other facts have been also witnessed which exceed in horror even what has been related of the soldiers of Northern Abyssinia. On the first military expedition to which the British Embassy was invited, on the evening of the successful foray, the limb of a sheep was most wantonly severed from the live animal with a sword when the wretched beast refused to proceed further, and the mutilated trunk left bleeding upon the ground, to be hacked piece-meal alive by any in the rear of the column of savages who had no store of provender. That the flesh might have been served up quivering with the life-blood is also extremely probable, though it might not necessarily have been taken from the living beast, for the animal is invariably killed at the very door of the eating house, and it takes but a short time after the breath is out of the carcase to hand up the raw meat to the feast. Whatever might have been the custom 80 years ago, now-a-days, the animal is invariably in the first instance killed after a fashion.

73. A rush of 10 or 12 men is made on the victim, his legs and horns are seized as a purchase, he is thrown upon the ground, when the throat is hacked through with a blunt knife in the name of the Holy Trinity, and the poor beast is left to struggle and stagger about until the lifeblood be expended; then commences an indiscriminate onslaught of knives, swords and hatchets, without the preliminary operations of skinning and cleansing. Bigotted to a degree, the animal if killed by the hand of a Moslem is considered in the highest degree impure, and reckoned on the list of even lower esteem than the unhallowed flesh of pigs and bears, geese, and wild fowl.

74. The Abyssinian in general is too well acquainted with the value of his own live-stock to urge him beyond his powers unmercifully, and often performs a great portion of the journey on foot rather than distress the animal to his own loss; but his treatment of Galla prisoners, and the almost certain dreadful fate which awaits any old or useless male who falls into his hands, is a sufficient blot upon the Christian name, without the addition of any other crime whatever.

75. Here, as elsewhere, eating is one of the most important concerns of life, and on the days of the great festivals, the palace displays all the pomp remaining in the land, and the unusual sight of the population somewhat aroused from their customary state of lethargic bestiality; the stair cases are lined with groups of priests and monks in their holiday

suits, and the courts are filled to overflowing with the chiefs and nobles, who on these gala days cast aside their abhorrence for the use of water, and appear dressed in clean white robes.

76. The king reclines in state on his best velvet cushions, and the royal alcove is tricked out with gay gold cloths and massive silver ornaments; seated on the ground immediately before the presence, are his most devoted and valiant governors, and around his couch swarm a group of young pages, the tableau being most probably taken from the Old Scripture pictures, where cherubs are so profusely introduced surrounding the principal figure. A long line of attendants stretching on either side of the throne stand as fixtures against the walls, each bearing in his right hand a straight silver sheathed falchion. The room is of large dimensions, and the height and gloomy ceiling in some degree compensate for the absence of architectural decorations, whilst the lofty walls are relieved by a display of all the state shields, which are profusely studded with silver bosses, crosses, and ornaments, and depending from each buckler the velvet mantle droops gracefully by its side, glittering in every hue and color of the rainbow.

77. At an early hour, a horse-shoe table is extended the entire length of the dwelling, and is so entirely heaped with viands, that not a twig of the wicker work is visible beneath the load. Piles of wheaten cakes touching each other, and strewn with fragments of fowls, tower up two feet above the surface. Bowls of rich curry, decoctions of red pepper, flanked by bottles of old hydromel, heap the groaning board, and numerous slaves are ranged at intervals with large baskets of delicate raw flesh, which has been just stripped from the slaughtered bullock.

78. The preparations for the feast are completed by 8 o'clock in the morning, when the great doors are thrown open, and a burst of wild music from the king's band ushers in the company; four hundred sit down on the floor at a time, ranged in double row besides the table, the chief men in the front rank, and every justice is done to His Majesty's hospitality. The piles soon sink beneath the active attacks of the guests, and the rising hum proclaims that the hydromel is of the most potent quality. Numerous attendants are in waiting to administer to the wants of the honored guests, by handing with their fingers from the viands whatever is desired, and a piece of meat if not relished by the first person into whose hand it falls, is passed to the next inferior,



and thus runs its course down to the individual, whose rank incapacitates him from rejecting the proffered morsel.

79. During the repast, the fiddlers and harpers who are stationed in the opening of the horse-shoe, dance and sing to the notes of their instruments, and ever and anon the shrill notes of some "Asmaree" stationed in a corner of the hall, rise thundering to the very roof, in acclamation of the generosity, hospitality, and magnificence of the great emperor of the Amhara.

80. After the guests are fully satisfied with food, the company rise, and each being provided with a large horn of mead, lounges against the walls to complete the inebriation which has been but partially effected at the table, whilst crowds of well dressed female slaves speedily replenish the diminished structures of food and liquor.

81. The great doors are again thrown open, and a fresh set enter amidst the increasing din, and the entertainment is continued till late in the afternoon; etiquette enforcing on these occasions the presence of the monarch throughout the entire time. Hundreds of bullocks are devoured, together with many more measures of wheat than can be well conceived; but altogether considerable decorum is preserved, and although the guests reach a maudlin state of drunkenness, yet the presence of the king is generally respected, and the exuberance of incited mirth expends itself in harmless praises of the royal host.

82. Such, however, is not the case at private parties, the curb of restraint is allowed to fall loose, the fierce passions gain along with the liquor the entire ascendancy, and guests seldom return to their homes, without witnessing the broil and the scuffle, the flashing of the swords, and the dealing of deep cuts and wounds among the drunken combatants.

83. Sunday is the great day for feasting, and is universally believed to have been designed for the express purpose of eating and stuffing. Men do not labour in the fields, women abstain from grinding and sewing cloths; and although other work is carried on as on ordinary week days, the chief employment for all who can afford it, is to pass the entire time in eating, drinking, and sleeping.

84. The influence of the evil eye is supposed to have little or no avail within the palace walls, and the great door is suffered to remain open during the operation of eating; but elsewhere it is scrupulously

barred and closed, and a fire is invariably lighted before the peasant, who will on no account appease his hunger, labouring under the strange superstition, that otherwise the devils would enter during the dark, and that there would be no blessing upon the meat.

85. It has been conjectured by Pliny, that the orientals received their first hints of building from the swallow, and that in imitation of their feathered instructor, their first attempts were made in clay. Where the Abyssinians obtained their ideas on this subject it were hard to tell, but certainly they have made little progress in architectural design, and their houses, constructed as in the earliest day, are still mere frameworks, sparingly daubed over with a thin coat of mud. Here thieves can easily break through and steal, and the materials are of such a flimsy nature, that the morning sun oftentime rises a witness to the truth of the scriptural metaphor: "He built his house upon the sand, and it was swept away by the rising flood."

86. Of the rudest description, these hovels are composed of mud and rotten twigs, and perfectly pervious to the inclemencies of the season, they subject the occupants, from the cold damp air, to all the pains of rheumatism and catarrh. There are no conveniences in the shape of glass or other transparent substances, and if the door be closed on the dense unhealthy fog and the cold bleak wind, all possibility is denied of admitting light; the thermometer rarely rises above 65 degrees, indicating the necessity for artificial heat, whilst there exists no vent for the smoke, excepting through the door and the cracked apertures in the walls.

87. In the town, from the want of sewers and drains, the inhabitants are obliged to live like swine in the filth of their own styes, inhaling all the effluvia of decomposing matter and putrifying water; the comfort of space is never consulted, passages and out-houses are far beyond the intention of the proprietor, and with doors allowing full ingress to injurious currents of air, with roofs admitting the rain, and floors covered with unwholesome damp, it is surprising that many more of the inhabitants are not made martyrs to disease. Some few years ago, epidemic dysentery made its appearance at Ankobar, and as might have been expected, rioted to excess in the foul location. One-half of the population was swept away, and the remnant fled for a time from the hill, which they declared to be blasted by a curse from heaven.



88. In the country, there is no attention whatever paid to cleanliness or comfort. The stagnant dunghill is carried by the descending rain but a few yards from the walls, and the cattle and poultry are allowed to share the general apartment; misery and confinement are strikingly pourtrayed in the worn-out thatch and the wattle stockade which surrounds the farm steading, whilst the inmates themselves, although supplied with an ample sufficiency to sustain the mere necessities of life, exist amid dirt and vermin, without experiencing much comfort even in the moments of their very highest enjoyment.

89. It is the practice of this uncivilized country to keep the demise of royalty a profound secret so long as possible, in order to avert the anarchy and confusion that would not fail to occur during an interregnum, when every individual in the kingdom considers himself at full liberty to act according to the best of his imagination, without fear of punishment. Whilst there is no king there is no law, is the maxim in Shoa, and the foulest crimes are committed with the most perfect impunity. On the news of the death of Assfawoosun, the streets of Debra Sibanoo ran red with blood, and 800 victims were immolated to private malice and revenge, before the appointment of his successor was proclaimed, and justice and order re-established on their seats.

90. At other times also, the great Christian maxim is too apt to be forgotten. The Abyssinian remembers only that he is savage, and revenge, as usual, takes up the first position in the mind. Many a dark deed has been cowardly enacted in the deep forest or in the confused skirmish, and the Gallas have been oftentimes most wrongfully accused of foul murder and death, when the victim has fallen under the assassin spear of his false comrade; and indeed the rulers and leaders of armies are on this account always much disinclined to lead their forces through difficult woods and defiles, being well aware of the dread effects of Amhara treachery.

91. It is deeply to be lamented, that any nation whatever should esteem even the heads of the slain as the great emblem of victory, but the more atrocious and disgusting barbarity of Abyssinia, the base idea of which is so revolting to humanity, is the filthiest ceremony that ever disgraced any styling themselves a nation. The frailty of human nature is indeed discernable in the most legible characters, and he who witnessed the unhallowed proceeding cannot fail to offer up a fervent wish,

that the time may be hastened when nations shall be knit together in the bonds of love, and when true Christianity shall reign triumphant in every heart.

92. On the close of the foray, each follower who has slain a male creature ;—*murdered* would be the proper expression, for the grey hairs of venerable age and the tottering step of smiling infancy prove no safeguard to the ruffian monster ;—proceeds to mutilate the body, and carries off the token of his crime carefully preserved in the bloody folds of his waist cloth. The disgusting trophy after being prepared over the fire is hung dangling to the right wrist, and on the following day, each in his turn presents himself before the approving monarch, who halts at intervals at the time of march for the purpose of witnessing the foul exhibition. Group after group, dash in from the flocks, resounding their war song in chorus, and whilst brandishing their spears and their vile trophies, the lying murderers shout their prowess aloud :—“ I have destroyed my enemy in the open* plain, I have rushed upon the foe, and slain him in the wood. I am the king’s great soldier, may Sabela Selassie live for ever.” After the savage Christian has fully displayed his wanton cruelty he sinks prostrate to the ground, and by his mean grovelling subserviency, fills up the full measure of Abyssinian iniquity.*

93. All proclamations are made after beat of drum by the king’s heralds on the outside of the palace gateway, the removals and appointments of governors, the promulgation of religious doctrines, and His Majesty’s commands on all general subjects ; but the order of assemblage for the military expeditions issues forth in pithy language from below a small stunted tree at the foot of the palace hill of Angollala.

94. “ The king hath foes and is about to subdue them on a certain day, who fails to present himself at Zallo, armed and carrying provisions for the specified time shall be treated as an enemy, and shall forfeit his property during a period of seven years.” The penalty, however seldom requires enforcement, all the Amhara respond to the call with the ut-

* This horrible custom if not borrowed from the Jews, is probably of Galla origin, and is early mentioned as being practised on the coast of Africa, vide De Bry, 1599, De Caffrorium militio. “ Victores, victis cæsis et captis pudenda excidunt quæ exsiccata, regi in reliquorum procerum presentis offerunt.” This is a very ancient African custom. It is represented on the walls of the temples and tombs in Egypt. See the French Institute’s “ Description de L’Egypt.”—Eds.

most alacrity, for the insatiate love of blood and the inherent hatred of the heathen are sufficient inducements to quit home and family, and follow to the foray the great crimson umbrellas, in which they place the most unbounded confidence.

95. Every thing, however minute which is found by a subject, is carried straightway to His Majesty. The brass bowl of a pipe and a bottle of lunar caustic which were lost during the expedition were forthwith brought in by the finders, and restored. On his way to Adgollala, a servant of the Reverend Mr. Kraff was swept away by the torrent in the Mosaliet river, and a tea kettle which he carried was lost; six months afterwards the utensil was found by a woman and taken to the king, who on being asked for it, said, "No, it will do for myself."

96. All presents received by the subject are also immediately carried to His Majesty for inspection, and it rarely happens that the individual is suffered to retain any part whatever. Brought before the sovereign as a peace-offering, the budget is generally received with an "*exogeer casto*," "God give you more," and forthwith transferred to the storehouse of finery which has been filling for ages. The more trivial portions of the present may be sometimes granted to the receiver as a wonderful mark of the monarch's favour; but in all cases, an equivalent in cattle or country cloths is afterwards made from the royal stores.

97. On the occasion of any loss by fire or other accidents, the begging sufferer makes the round of his acquaintance, who each contribute their mite to the subscription, and wonderful scope being given to imposition, the individual becomes more wealthy than before. Constant application is also made by the domestics of the royal household to obtain the price of destroyed articles, in order to save them from condign punishment. An offender was detected in bringing the same broken decanter three times over, and a shield was never said to have been broken or a mule lost, but the delinquent did not refer himself to the embassy for the amount of the fine.

98. Tainted with base servility, the Abyssinians pay the most abject respect to their superiors, and however aggrieved, are seldom heard to complain of the governor. The king is held in the highest adoration, and the oath by his life is the most binding in use. If adjured by this a person can be punished for non-compliance, and the wilful breaking the obligation renders the perjurers liable to severe penalties.

In addressing equals or children, the second person singular is used. Superiors are entitled to the third person plural, and disputes are easily excited, especially among the fanatic priesthood, by not paying sufficient attention to this point of etiquette.

99. Respect is here paid by prostration to the earth, and after the most degrading and humiliating fashion, bowing the face among the very dust, by uncovering the robe, and exposing the naked person, and by kissing the nearest inanimate object on entering a house.

100. The most grovelling adoration is paid to the monarch, and to many of his chiefs. All of whatever rank when they approach the presence, throw themselves prostrate upon the ground, lie flat on their faces, and knock their heads three times upon the earth. The inhabitants bend in the mire at the approach of His Majesty, and the troops of horsemen as they emerge from their different districts to join the military expedition before mingling with the general mass, stream at full speed to the vicinity of the royal umbrellas, and pulling up at a prescribed distance, spring from their saddles, and all simultaneous leaders and followers perform the degrading prostration.

101. Every native uncovers his person when in presence of or in conversation with the king, whilst to equals the corner of the robe is only removed for a time, and then suffered to resume its fold over the shoulder. Inferiors are obliged to stand continually unclothed in the company of their masters, and any small present bestowed upon the servant, must be received with both hands in a cringing position, whilst the nearest object, generally the threshold of the door, is kissed in token of devoted love and affection. Suspicions of treachery and revenge may have possibly originated this strange custom of uncovering the person, and the concealment of dangerous weapons is totally debarred, when the law is enforced of making all strip themselves so often during the course of the twenty-four hours.

102. Although not particularly addicted to the merry mood in general, and exceedingly ignorant withal of any thing resembling stage effect, yet the palace buffoon elicits shouts of laughter by his uncouth antics, and attempts to personate the character of the adjoining tribes, who are looked down upon with the utmost sovereign contempt; and on the days of interview with these wilder savages, who come dancing into the presence chaunting their war songs, and decked out with feathers and

warlike implements, the buffoon mixes in the dance and delights the Amhara spectators by the performance of his caricatured gestures; but in this department the country can only boast of the king's mimic, who retains his situation without fear of rivalry; here there is no field for genius, and it would prove a hard task for the jester to devise any thing more ludicrous or ridiculous than the ungraceful dance of the Amhara, the impassioned caper of her priests, or the idiotic whirl of her warriors.

103. Following the custom of the dark ages, dwarfs are treated with considerable fear, respect and consideration, and many of the most learned and praiseworthy in the land are to be found among the small misshapen race. The king's father confessor is of the most diminutive size, though possessed of great good feeling, and forming a striking contrast to the generality of his nation. The chiefs and nobles often choose their secretaries and household priests with reference to their tiny appearance, and the wisest man in the capital, whose charms and talismans are considered all powerful, and who knows every plant by heart from the "cedar of Lebanon to the hyssop that creeps over the garden walls," sustains his character for lore, as much by the deformity of his appearance, as by the brilliancy of his understanding.

104. No petitioner ever enters the presence of his superiors unless furnished with an offering according to his means, as a bribe to propitiate favor and good-will. Cattle and honey, cloth, wood and money, and even stones being presented when building materials are scarce.

105. Presents are frequently exchanged among the chiefs and great men, and every display is attempted on the occasion, the train of bearers being lengthened out as much as possible by dividing the articles into the most minute portions, and all are covered with red cloth; every thing must also be exposed to the view of the receiver, wild bulls and unruly he-goats, as large as donkeys, are dragged into the sitting apartment to the imminent danger and pollution of all around. Cocks and hens, loaves of half-baked bread, and pots of rancid butter, must be all closely investigated and personally approved of, and any deviation from this rule is certain to be visited with the most dire displeasure.

106. An easy and ingenious method of extortion exists in full force throughout the land, and all classes are equally amenable to its abuses

and privileges. Bringing any article whatever, the begging petitioner hands it over to his superior as a "*mamalecha*" or memento, for whatever he has the assurance to demand. Servants bring a stick or a bunch of grass, and ask for swords, clothes, and money; and chiefs and officers of the state present to His Majesty a pot of honey or a cotton cloth, and demand a horse or a mule, or an embroidered garment. If the *mamalecha* be received, the modest request must be acceded to, and indeed the custom of the country imperatively requires that the extortion should be invariably complied with.

107. With the first dawn, bands of petitioners station themselves on the top of the eminences adjacent to the palace, and the cry of "*aliet*," "*aliet*," "master," resounds deep in the still air of the morning; the door-keepers order them to draw nigh, but well aware of the understanding between these servants and the "four chairs," against whose decision they are appealing, they give no heed to the summons, but lift up their voices the louder, until the king orders one of his pages to cause the whole to assemble in the court-yard. At home and abroad, on excursions and military expeditions, the cry of "*aliet*" salutes the royal ear from the most strange and unexpected situations, and is in general, promptly attended to; the stick, however, is sometimes applied to the most importunate, who will not remain content with the promise of a future consideration of their claims, but every available opportunity is taken by the king of listening to these endless petitions and appeals. The halting stones on the green turf are frequently transferred into seats of justice, judgment is given whilst ambling over the fields on private excursions, and three-quarters of the entire day, with the exception of the Sabbath, is devoted to unravelling the knotty points of controversy, or settling the disputes and quarrels of his subjects.

108. In Shoa, the men have the entire responsibility in all the bargains regarding cattle and sheep, farming and warlike implements; and the women barter in the minor articles of sustenance, grain and pepper, salt, ghee and earthenware. And although the man cannot carry the water or bake bread, he must wash the foul linen belonging to both sexes, an operation which is performed in the running stream, the clothes being deposited in a skin together with the seeds of the *indote*, and well trampled under foot. It is the province of the men to plough, sow and reap, split the wood, cut the grass, and repair the house;

whilst to the women all the other heavy work is accorded, as fetching wood, water and grass, making butter and bread, spinning, pounding and grinding. Markets are held once a week in various parts of the kingdom, and the weekly supply for household use is then laid in. Men and women indiscriminately attend, each occupied by their own peculiar duties; at other times in all the towns and villages of Abyssinia, there being neither open shop or bazar, the Owenian system of barter entirely prevails, and the proprietor of any article who wishes an exchange perambulates the streets, calling aloud from door to door the nature of his goods, until he finds some individual willing to make the desired barter.

109. Love rules neither camp nor grove in Abyssinia, but base sensuality is indulged in by the grossest indiscriminate intercourse. A permanent female is sought for as a household drudge, the child is delivered over into bondage without any reference to her own wishes, and remains with her mate only until she can better her miserable condition elsewhere.

Women of rank, however, and more especially those of royal blood, assume high grounds and pretensions, for the honor has been conferred by linking with the lot of the subject; the reins of authority are generally taken violent possession of, the order and the command issue in the name of the lady, and the hen-pecked husband on whom the alliance has been thrust, is obliged in his own establishment, to endure in peace all the despotism of the palace.

110. In all matters of quarrel and dissension, should either of the parties desire to be reconciled, the matter cannot be adjusted without the intervention of a mediator; a third individual is sought for, who will undertake the arrangement, and in his hands the affair is entirely placed. The king himself often accepts the office, and of course is rarely unsuccessful in his applications. Inferiors come into the presence of their offended masters with large stones upon their heads, and prostrate themselves upon the earth in token of their fault, which, however, is generally forgiven on the intercession of the mediator. Quarrels between man and wife, if not allayed with the cudgel, or of that serious nature to cause separation, are settled by arbitration; the neighbours assemble to discuss the matter, a judge is instituted for the occasion, the parties are mutually examined, and a fine is imposed according to the

merits of the case : a string of beads, if the husband be in fault, and a pair of new breeches should the lady be found napping. A woman supposed to be unfaithful to the conjugal, "*alga*," may be returned to her friends with a portion of her property, but one caught in the act of infidelity can be well beaten, and ejected stark naked from the house ; these extremities are seldom indulged in, and mutual forbearance seems to reign paramount in Shoa.

111. But this universal loose style of living exercises a most baneful influence on society in general ; the mind becomes degraded, whilst the body is enervated by disease and indulgence ; jealousy is rife in every house, and the children of each separate female on the establishment are bandied against each other in all hatred and animosity, which is by no means allayed on the death of the parent, or by the posthumous intimation of his partial and unfair distribution of property.

112. On all occasions of rejoicing and ceremony, whether on the successful return of the king or of a private individual, on the sight of a procession or on the discharge of fire arms, the women with their characteristic love of noise, burst out into the most thrilling clamour of welcome. Moving their tongue with more than ordinary volubility against the roof of the mouth, they produce continuous successions of shrill notes, which are more agreeable to the listener than to the performer. One watchful dame on the outskirts perceives the approaching cavalcade, and forthwith gives out the clamorous note of warning ; in a moment the entire mountain side is covered with every female in the location, yelling in full chorus ; the *hillil—lil* progresses fast and furious, as they bend their bodies nearly double to assist in up-raising the melody of the tone, the tears stream from their eyes in the violence of the exertion, and the hills resound far and near with the gathered volume of the shrill notes.

113. One of the strangest of Shoan customs is the method of salutation ; the most earnest enquiries being invariably made regarding your own health and that of your house, horse and children, as if the enquiring party was really interested in the result. Even two old women tottering on the very brink of the grave, and afflicted with every pain and sorrow under the sun, meeting in the street, pull up and commence a string of good wishes, which are reiterated as long as the breath will come out of their old bodies. How are you ? How have you passed

your time? Are you well? Are you very well? Are you perfectly well together with a thousand other pert interrogatives to be made acquainted with their private condition, and at each response the Deity must be invoked as to the great happiness and perfect felicity which have been experienced since last sight. Should the meeting take place twenty times a day the same ceremony is enforced, and for each progressive state of morning, noon and eve, there exists a distinct set of phrases, which from their continual repetition sound grating upon the senses. Passengers stand in the streets and roar out salutations intended for the inmates and huts a hundred yards from the hedge. You are startled from your sleep by a dunning—How are you? from some gentleman passing before day dawn to his country residence, and your ears are afflicted from morning sun till evening, by a most teasing and harassing string of enquiry, from every one who passes himself off as an acquaintance.

114. The *buldurba*, or introducer, is appointed from amongst the retinue of every one who keeps an establishment, on the first introduction of the parties. To him, and to him alone can the visitor look for admittance into the house, and unless he is present, the monarch and the great man are alike invisible. Court-yards may be thronged with many attendants, and doors may seem invitingly accessible; but the "open sesame" is wanting, and the stranger returns to his own abode disgusted with the insolence as well as inconvenience of the custom. Time, however, softens down the rigidity of the practice, which is at first so pertinaciously observed; suspicion of evil intention gives way, on better acquaintance of character, and after a certain probation. There is much more difficulty experienced in gaining admittance into the lordly Abyssinian hut than into the lordly halls of an English nobleman.

115. Suspicion may also be easily traced in the custom of all great people moving from their domiciles with a long train of armed attendants, as in the height of Highland anarchy. The tail of the McGregor was seldom of longer dimensions than that of an Abyssinian nobleman. Indeed he is never allowed to be by himself, whether in the cabinet or in the field he is invariably surrounded by a numerous band of mean sycophantish attendants. The custom of the country enjoins the practice, the cheap price of provisions enables him to feed a large population and the lack of all manufactories, supply an unlimited number of idlers, who are willing to obtain a livelihood in any manner whatever. But the

nuisance is a crying one to the stranger. No privacy is ever enjoyed. No retirement is ever suffered. A dozen naked savages are continually by your side, restrained by no very correct ideas of order or discipline ; the confused hum and suppressed chattering are by no means of assistance in study or writing, and on the occurrence of meals or of the visits of illustrious people, the whole establishment tumble in naked to the waist to satisfy their own inordinate curiosity, and to do honor to their lord and master.

116. Visits are generally made early in the morning or before noon, and it is reckoned discreditable to enter a strange house after meals, as the object of the untimely advent can only be attributed to a desire of obtaining the food and refreshment of which the etiquette of the country enforces presentation. Sneezing is accompanied by an invocation to the Trinity, and the bye-standers are expected to exclaim "*moroo*," God bless you, and eating is invariably attended by a loud smacking of the lips, which can be heard at some considerable distance from the entertainment ; none but beggars eat their food in a quiet and rational manner.

117. There is no sense of decorum evinced in the satisfying of any desire, however gross, and no shame whatever is felt in exposure to the gaze of the public. The toilet is unscrupulously performed in front of the assembled multitude, and his Majesty himself, the most polished gentleman in the kingdom, blows his nose with his fingers, and wipes the soiled hand upon the robe of the nearest courtiers, who eagerly proffer the cloth for his acceptance. More offensive than the Amaponda, who carries his own little cleansing spade tied round his neck, the first object is seized by an Abyssinian upon entering a strange house, and ears and nostrils are scraped out with the most savage indifference to appearance. All sleep stark naked, stretched upon bullock's hides, huddled close together for mutual warmth, each loving batch being covered with the accumulated pile of individual garment. Should the master of the house require food during the night, a piece of raw meat and a horn of beer are brought to him by a male or female attendant, who, destitute alike of clothes and decorum, stands unconscious of all shame until the craving of his hunger be satisfied ; and owing to their foul feeding and their more uncleanly habit of never washing, cutaneous eruptions spread like a plague over their unsavoury persons, and few indeed are free from the disgusting diseases of the beggar.

118. Their amusements are few indeed. At rare intervals, shooting vultures and monkeys in the woods, or running down partridges among the hills with their dogs, throwing the spear on foot at a mark, or mimicking the art of war on horseback, moving in the uncouth dance, or singing the war-song in chorus, whilst the games of *gibbeta* and *shuntridge*, and the annual throwing the ball at Christmas, fill up the scanty list.

119. The spear is generally launched at a short distance, and the unsuccessful competitors are obliged to lay down with their faces upon the earth, whilst all the better marksmen trample and triumph over their prostrate necks; and in the "*yombeza*," the mounted warriors with blunt lances choose a spacious plain and perform at speed all their evolutions of war, attacking and defending, throwing the reed and receiving upon the shield, and whooping and yelling to proclaim the victory, the delivery of a sure spear thrust, or the hemming among their own number, one of the opposite band.

120. The "*gibbeta*" is a game somewhat resembling back gammon, but is played with sixty pewter balls, which are stored in 20 holes over the board; the distribution of these balls and the judicious heaping up of the stones according to certain complicated rules, constitute the science of the game, which is, however, sufficiently intricate to foster a spirit of betting and gambling, which reigns in full force amongst the nation.

121. *Shuntridge* is nearly the Arab game of chess, but the board and the men are very miserable productions of genius; a few of the moves are somewhat different, and the game is almost entirely confined to the court eunuchs, who bask their portly forms in the verandahs of the palace, and pass away their idle hours in very indifferent play.

122. On the Christmas, an annual contest takes place between the king's household followers, the dependents of the purveyor general, and the Deek Agavari. A cloth ball is struck with a mallet, and a struggle ensues for the possession of the missile; three times the ball is discharged over the plain, and the party are declared victors who have thrice caught it in succession. They enjoy the privilege for the day of abusing the vanquished, the king only excepted; every tongue being unloosed and the foulest abuse and slander being heaped upon the most illustrious as well as the holiest personages of the court. The day is

concluded by a grand entertainment to all, at the cost of the chiefs of the defeated party.

123. The king's band is composed of simple reeds of various length and sizes, the "*imbeta*," having in the upper part an aperture over which the mouth is placed, and the "*mihut*," which is fashioned somewhat after the form of a trumpet or trombone. Each performer has but one pipe, and consequently like the Russian, is master of but one note; there is no particular air or time attended to, each giving out his breathing very much as he chooses; but the wild music falls soft upon the ear like the harmonious sound of the Panden pipe blown over by the breeze.

124. The Abyssinian fiddle, the "*musuncho*," is of rude form and fashion; an empty gourd or a hollow square of wood being carved with a piece of parchment as a sounding board, and a bit of rough stick inserted in one corner to serve as the neck; there is but one string, and as the performer is not a Paganini, the inharmonious sounds proceed from the instrument as if the unhappy spirit of music was confined in the interior, and uttered harsh screams and moans as the bow proceeded to inflict fresh tortures upon her agonized sinews. Some continue to perpetrate a very faint resemblance to tune; but all consider themselves at perfect liberty to scrape away in the most persevering and soul-sorrowing fashion, and unlucky indeed is the site of residence if stationed near the proprietor of a *musuncho*.

125. The harp, called "*buggana*," is a most strange fabrication of wood, leather, and sheep's entrails, and presents an appearance as if an old leathern portmanteau had been taken by children as a foundation, and built up with the rudest materials to represent the lyre in the days of Tubal; nor do the notes belie the first appearance of the instrument, or bestow any credit whatever on the fashion. It has five strings, and is used only as an accompaniment to the voice, a simple monotonous cadence of the individual notes being the only music produced.

126. The large drum, called "*kubbers*," and the small one "*nagga-rect*," are not thumped so continually as might be expected, they are exclusively reserved for military expeditions, or for doing honor to the happy return of friends and relations from successful journeys, and it is indeed lucky for foreigners, that the nation with their present set of crude instruments is not infected with a musical mania. The silence of



night is seldom disturbed by the discordant sound of their barbarous attempts.

127. A portion of the vocal music is of a more pleasing description, and some of the airs which the women croon over their work are even soft and plaintive. There is, however, no great change of note in the strain, which has generally reference to the particular operation in which they are employed.

128. The recitative of the war songs is pitched in a high key, and chaunted by a single individual at the top of his pipe; and the thundering chorus, which consists of a few words in deep base, is at intervals poured from every throat in the party, with great effect. The return of a successful army is indeed a most striking pageant; the glitter of the silver ornaments, the flashing of gay cloths and housings, and the shrill chaunt of the fight, closely followed by the pealing bass of triumph echoing from ten thousand merciless throats, forming altogether the very embodying of savage exultation.

129. Their church music is most execrable; although seven long years are passed in its acquisition, and the constant practice of many hours during the day ought to make them somewhat more perfect. Howling and screaming, however, are the most appropriate terms to be employed for this ceremony, and the hoarse cracked voice of the priest, increasing in fury as he progresses in his task, is in true keeping with the jingle of the "*itsnassil*,"* the Abyssinian timbrel, which in its startling effect, can be compared to nought but the rattle of the poker upon the tongs.

130. From four in the morning until nine of the Sabbath, this clatter and ranting is continued for the *honor* of their religion in all the churches of the kingdom, besides a full muster of their croaking choristers on all their numerous holidays and festivals; and the band of stout priests who nightly mount guard to preserve His Majesty by their song from the influence of evil demons, have certainly chosen a cunning path to prevent the advent of, at least, all those spirits who are gifted with any musical taste.

* This is the "sistrum" which is thought to be included under the Hebrew term "Tzitzzelem," and is composed of a frame of sonorous metal crossed by bars of the same; these bars move freely in the holes through which they are passed, and when the instrument is shaken, the reverted ends striking upon the frame produce the clattering sound.

131. The attending dance of the priesthood is any thing but a relief to the picture ; the most uncouth attitudes and the most ungraceful positions are selected, whilst the beard and the crutch and the aged face are but in ill keeping with the mountebank jumps and capers performed upon the occasion. During the merry-makings in the palace and in the houses of the chiefs, the dance is also not distinguished by any less ludicrous effects, the votary seemingly enacting the part of a gander justly infuriated at the discordant sound of the music, shaking his wings and hissing in contempt of the fiddler's art, whilst he shuffles about in a crouching position, and makes sundry furious rushings and startings to possess himself of the obnoxious instrument.

132. The language of savages is generally highly metaphorical, and they are not satisfied unless action be embodied to the eye by color and character and form brought more vividly to the mind by the assistance of allegory, but this nation is equally unsuccessful in the personification of the spiritual, as in the abstract language of Theology.

The king and his chief singer form the only exceptions, the court language being sparingly sprinkled with a few flowery speeches, and the singer sometimes breaking out into crude allegorical sentences. " Why should the Father of song be restrained from dancing before the fathers of gold," he exclaimed when capering before the embassy on the steps of the palace, and the saying was responded to with shouts from the populace ; but the topics of discourse are always scanty among an uneducated race, and after the daily salutations are performed, nothing can be more rapidly stupid than the succeeding conversations of the native of Shoa.

133. Few but the priests and *deptras* can read or write, and many among those learned scribes are more indebted to the memory of their early youth, than to the page held in their hands for the forthcoming rant.

134. The ancient Ethiopic, which is also called Gees, remained the language of the empire only until the 14th century of our era, and in this idiom are written all the annals of her religion. It has now, however, fallen into disuse, and the people of Tigri alone retain one of its dialects. Amhara is generally spoken throughout the country.

135. The stores of literature being thus bound up in a dead letter, mistakes and false readings cannot be discovered in the low mumble of the officiating priest by the bystanders, who are alike ignorant of the text and the language; nor is the course of study of that extended or liberal nature to enlarge the mind of the neophyte. To know the Psalms of David by rote, together with the miracles of the Virgin Mary and Saint Tsela Huimandt, to elevate the voice into howling song, and to cut a caper into the air two feet above the surface of the earth, forming the envied accomplishments of the man of education.

136. Parchment is said to have been invented at Pergamos when the Egyptian monarch prohibited the exportation of papyrus. The Jews very early availed themselves of the Charta Pergamora to write their scriptures upon: the roll is still used in their synagogues, and was introduced into Abyssinia on the Hebrew emigration, where it still continues the only material in the country; but all the books extant are composed of many small leaves fastened one upon the other, enclosed between wooden boards, and carefully deposited in leathern sacks; many are embellished with glaring colored daubs, and all are looked upon with the eye of superstitious credulity.

137. The epistolary correspondence* is exceedingly laconic; the letters are folded up into small rolls, varying in size from one inch to four, and always enclosed in a coating of wax; there is neither signature nor superscription. The king possesses a signet seal, which is however seldom applied, as the names of all parties are introduced into the body of the note.

138. The pen is the reed, *kulum* of the East, without the slit, and the inkstand is the sharp end of a cow's horn, which is stuck in the ground as the scribe squats to his work; the ink is a foreign importation from the Somauli coast, and remains an intense black for ages, and the writer when he wishes to replenish his horn, inserts a few particles from his pocket, and adding a little liquid, produces a consistency similar in thickness to that used in printing.

* May this letter of queen Bezabesh come to my friend the English Ambassador. Are you well? Are you quite well? Are you perfectly well?

That the soap may not end speedily, you will send it in large quantities, saith Bezabesh.

139. But the Abyssinian scribes do not hold the pen of a ready writer, and the dilatory management of their awkward instrument is attended with gestures and attitudes most distressingly ludicrous, clutching the tiny style like a hot apple in the paws of a hungry ape. It is carried with the most convulsive twitches, and seemingly by some supernatural force to the mouth of the writer, where the end is seized between the teeth and masticated, in a sort of mental phrenzy. During the whole period of this strange operation, the thin strip of dirty vellum is held at arms-length and viewed askance from every side, with looks of utter horror and dismay, and when at last the stick descends to dig its furrow upon the parchment, no terrified school-boy with the birch of the master hanging over his devoted head, ever took such pains in pointing the most elaborate pot-hook, as does the Abyssinian scribe in daubing his strange characters upon the scroll.

140. Like the Chinaman, each individual letter must be looked at from every point of view, before progressing to the next; every word must be read again and again by the delighted artist, and the greasy skin must be many times turned upside down by the grinning penman proud of his talents, to observe the happy effect of his handy-work.

141. During the intervals of approval, the destructive bites continue fast and fierce, to the utter demolition of the pencil; and long before the termination of the first sentence, European patience is apt to become utterly exhausted at the scene of awkward, foolish stupidity, and gross waste of valuable time. Seventeen years have been employed in transcribing a single manuscript, and a common epistle of five lines is the utmost extent of one entire day's exertion.

142. The following list gives the names of all the books at present in existence in Abyssinia. Tradition, however, records the titles of other works, which were deposited for safety in the islands in the Lake Zoo-ai, on the great invasion of Gragno, and which are said to exist with many other precious treasures of Ethiopia even unto this day.

1. All parts of the Old Testament, excepting the Pentateuch and the Books of the Maccabees.
2. The four Gospels with readings.
3. Chrysostom. Biography and Exposition of the Epistle to the Hebrews.
4. A dogmatical work of Cyril.

5. Genset. A book used in funeral solemnities, and ascribed to Athanasius.
6. Tethonegest. The code of Laws, said to have fallen from heaven.
7. Aclements.
8. Retuattaunanot. The Orthodox Faith.
9. Siena Aibud. History of the Jews in connection with the History of other ancient nations.
10. Mazopu. Extract from Ancient Philosophy.
11. Henosh. The Prophecies of Henosh.
12. Gadela Nudual. History of St. Michael.
13. Gadela zida Heimanot. Life of the Tecla Heimanot, the Saint.
14. Gadola Siena Markoo. Life of another Saint.
15. Gadela Gintra Maafao Kedus St. Zl.
16. Gadela Lalsbala. Life of a former emperor of Ethiopia.
17. Masgaba Haimanot. A dogmatical work.
18. Synodos. Canons of the Church, attributed to the Apostles.
19. Antiacos. Colloquy between Athanasius and a Nobleman called Antiakos.
20. Mazafa Mister. The principles of several Heretics of old.
21. Mazafa Dora.
22. Mazafa Timkal. Used in Christening.
23. Mazafa Actil. Used in blessing a Marriage.
24. Mazafa Keder. Used for instructing Renegades.
25. Gusbra Haimanot. Read during Passion Week.
26. Bartos.
27. Dionasios.
28. Teena Tetrak (Amharic.) Explanation of the Creation.
29. Tamera a Miriam. Miracles of the Holy Virgin.
30. Magara Miriam, Words of ditto ditto.
31. Godela Hawarjat. Lives of the Apostles.
32. Ardeet. Words said to have been spoken by Christ before his Ascension.
33. Kedasie. Liturgy of the Abyssinian Church.
34. Wuddassie Miriam. Praise to the Holy Virgin.
35. Arganon.
36. Gadela Samactal. Lives of the Martyrs.
37. Abushukur. Abyssinian Almanac.



38. Gadela Adam. History of Adam.
39. Kidan.
40. Egziabher Neges.
41. Anda Negest. Book for Prognostication : forbidden in Shoa.
42. Sadela Medhanalim. Life of the Saviour.
43. Amida Mister (Amharic.) The Principal Doctrines of the Christian Church.
44. Temhest. Extracts.
45. Kufalik. Words spoken to Moses on Mount Sinai.
46. Mazafa Gragore (Amharic.) History of the invader Gragno.
47. Serata Breta. Christian Institutions of the Christian Church.
48. Mewaset. Hymns on Mournful occasions.
49. Zema Degna. Hymns sung during Fast times.
50. Degna, Hymns sung on other occasions.
51. Lifafa Zedik. A Book of absurd Contests, much esteemed, and buried along with the Corpse.
52. Ekabari. Book of Prayers.
53. Zelota Musa. Prayers of Moses against the influence of Evil Spirits.
54. Melka Michael. Prayers to St. Michael.
55. Melka Ijesus. Prayers to Jesus and the Holy Virgin.
56. Gadela Araga. Life of an Abyssinian Saint.
57. Gadela Kyros. Ditto ditto
58. Gadela Johani. Ditto ditto
59. Kotat of the 318 Fathers.
60. Maala Saalat. Prayers and Hymns for different hours of the day.
61. Wuddassie Amlac. Praise of God.
62. Mazafa Tornal. A letter which Christ is said to have written.
63. Surguamie Fidel (Amharic.)
64. Melka Gabriel. Prayers to St. Gabriel.
65. Swaso. Abyssinian Dictionary.
66. Germana. Prayers to frighten Evil Spirits.
67. Fans Manfasawi.
68. Dersana Sanbat. Life of a Saint.
69. Tekarie Ijesus. Christ's prophecy of the consummation of the World.

70. Mazafa Shekeneat.
71. Tecla Zeon.
72. Harmanot ab. Doctrines of the Abyssinian Church.
73. Gadela Antonino. Life of the Monk Antony.
74. Zelota Musadud. Prayers against Evil Spirits.
75. Dezsona Gabriel. History of St. Gabriel.
76. Gadela Georgio. Life of St. George.
77. Selota Monakosat. Prayers of the Monks.
78. Felekosus. Book of Monking.
79. Marishak. Book of Monkery.
80. Aragawi Manfasawi. Ditto ditto.
81. Dersana Mahajawi. Life of the Life-giver.
82. Gadela Saunel.
83. Siena Aban.
84. Gebin Negest.
85. Geea Moie.
86. Epiphanius.
87. Aximarius.
88. Buni.
89. Synkesar.
90. Mazafa Berhanet.
91. Lowros.
92. Deduskalea.
93. Tamera Ijesus.
94. Ankoritos.
95. Mazafa Ishai.
96. Teliksiny.
97. Mistera Samai.
98. Georgis Waloea Amid.
99. Dersana Miriam.
100. Lik Evangel.
101. Taretech.
102. Gadela Ijob.
103. Thomas Koprianos.
104. Gadela Keduson.
105. Gadela Arsemaror.
106. Raia Miriam.



- 107. Gadela Abeb.
- 108. Gadela Makod Walale.
- 109. Gadela Guebru Christas.
- 110. Abicta Natrat.

143. Such is the accumulated literature of ages, and in the mass there are only four written in the language at present spoken and understood. His Majesty possesses a large assortment of manuscripts seldom referred to, and indeed with the exception of the Holy Scriptures, the remnant is but a tissue of absurd Church controversy, and lying monkish legends.

144. Thirty days constitute a month, to which five days and the fourth part of a day are added to complete the year; this interpolation is called "*quagmin*," and is introduced after the month of September, the 9th day of which, according to our style, commences the Abyssinian year. The year is also divided into four quarters, each being named after the Gospel, which ought to be at that season reading in the churches. From September to November, Luke gives name to the period; from December to February, John; from March till May, Matthew; and during the remaining months, Mark. Events are commonly referred to as having occurred during the days of Matthew, &c., but they have lost eight years in their computations of time, and our present Christian era of 1842, has only reached to 1833 of Abyssinian reckoning.*

145. Superstitious to a degree, the Abyssinian will undertake no expedition or serious journey without, in the first instance, receiving the desired omen of approbation from on high, and retracing their steps on various pretences, they remain in their houses for days until the welcome sign be witnessed. The sight of a hare is very bad indeed; an antelope springing across the road, good; a fox barking on the left hand, destroys all hope of a happy result; but on the right hand, a prosperous issue may be expected; but of all the numerous birds of ill fame, is the "*Goo-rasovula*." (?) Certain death or destruction, or the most dire disaster are certain to follow his croak, and there is no inhabitant in the kingdom, who has not some story to confirm the bad character of this evil bird. The fool-hardy wight, who giveth no heed to the warning note

* Giving the world an existence of 7334 years, they calculate that our Saviour was born in the year 5,500 after the Creation, and thus account for their deficiency.

being of a certainty either baulked in the object of his journey, robbed, maltreated, or murdered.

146. Savage man obtaining only through the medium of his own wishes and imagination a faint idea of the invisible and supreme Power, seeks for some tangible object of veneration and means of protection, and the Abyssinian, whose vague religious ideas afford him but small consolation in the hour of tribulation, and little reliance of security in the day of danger, reposes the utmost faith in the doctrine of charms, which present a substance stamped with a mystic and supernatural character, and capable of being attached to himself individually. The "*tulsim*," which is a worked zone studded with tiny leathern pockets, containing sacred charms enclosed in double and treble cases, encircles the waist of every man, woman and child in the kingdom; the arms and neck are also hung in a perfect panoply of amulets against the influence of every disease, whether experienced or anticipated; the written talismans of holy monks, mixed with the seed and leaves of potent witch plants, gathered by the hand of the forest recluse, afford a feeling of security which is not to be extracted from the leaves of the Gospel; and no one ever thinks of mounting his mule, without being well stored with these paper preservatives against the spear of the robber, or the sharp knife of the Galla.

147. On the first arrival of the Embassy on the frontier, the simple natives on their knees implored the gift of the anxiously desired charm against the charge of the dreaded lion, and the king himself, by no means free from the prevailing superstition, had in his possession two talismans, which till lately he considered of high dread and import; they were inscribed on parchment in the French language, one containing a portion of the Lord's Prayer, and the other the words, "May God open the eyes of Sabela Selassie to his errors."

148. Their superstitions are childish as they are numerous. They believe in the evil eye, in the existence of evil spirits who roam about the earth and waters, and in every description of omen, and the ignorance of many is passing strange, considering St. Michael to be God Almighty; the Virgin Mary the creatress of the world; and Sunday, to have been a saint of great sanctity, far superior to St. George or St. Michael, which has ensured for him one day in seven to be held holy to his name, whilst the others have their festivals only once during the month.

149. Eclipses of the sun or moon, as in other savage countries, afford an ample opportunity for the most abject superstition. They believe the orb to be dead, and that her demise prognosticates war, famine and pestilence. The whole town is in tumult and uproar, collecting together in the streets and churches, they cry aloud upon the Saviour of the world to take pity upon them, to screen them from the wrath of God, and to cover them with a veil of mercy for the sake of Mary, the mother of our Lord. The pagan Galla, who are present lifting up their voices, join in the petition, and from their not comprehending the Amhara tongue, render the most absurd construction on the prayer; the wailing continues during the whole period of obscuration, and when the orb again emerges, a universal shout of joy is raised, in the full belief that the prayers of the multitude have awakened her from the sleep of death. Any neglect on their part, of these accustomed exertions, is certain to be followed by some great public calamity, and the raining down of fire from heaven.

150. The "*beza*," or sacrifice for the sick, is considered lawful and efficacious, and is frequently resorted to; the animal which is meant as the type of the sick man is driven round the bed of the invalid amidst much noise and singing, and afterwards slaughtered outside the threshold, and at other times, an egg is turned three times towards the head of the patient, and then broken besides the bed.

151. Whilst no religion can be more corrupt than the nominal Christianity of this unhappy nation, which is a mass of absurdities borrowed from the Jew, the Moslem and the Pagan, nothing can be more humiliating than the superstition which it encourages. A thread of cotton yarn is stretched by the hired sorcerer during the night completely round the house, the extremities are fastened together by means of a link of iron, well imbued in blood, and the walls are freely sprinkled and bedaubed with gore, the day dawns upon the incantation which is supposed to be the work of the devil himself; and of the assembled multitude, who consider that some heavy calamity, if not instant death, would follow the act, there is not one individual sufficiently bold to remove the spell, and thus release the inmates from its withering effects. On one occasion, when the inhabitants of Ankobar were thrown into the greatest consternation by the dread appearance of the bloody finger, the Reverend Mr. Kraff tore away the charm, to the astonishment of all, without any fatal consequence to himself; but that very night the defeated sorcerer planned an attack



to rob his premises, which was only defeated by the extra vigilance preserved in consequence of having exposed the impostor.

152. No Amhara will venture to destroy a serpent save on Saturday and Sunday, when the sight of one of these reptiles is regarded as a favourable omen. In common with the heathen Galla, the Christians of Shoa make annual votive sacrifices in June to "*Sar*," the evil spirit, continuing the practice notwithstanding its being interdicted by royal proclamation under the penalty of forfeiture of property. Three men and a woman, who understand how to deal with the evil one having assembled at the place appointed, perform the ceremony in a newly swept house. The sacrifice consists of a ginger coloured hen, a red she-goat or a male Adaiel goat with a white collar; the blood of the victim having been mixed with grease and butter, is secretly placed during the night in a narrow street, when all who step or tread thereon, are supposed to receive the maladies of the invalid, who in return is restored to perfect health. The king perceived traces of this Pagan ceremony in the streets of Motatiel during a visit to that village some years ago, and tracing it to a wealthy individual who had caused the rite to be performed in order to free himself of syphilis, the honor of true religion was forthwith vindicated by a speedy transfer to the royal coffers of all the property of the dabbler in unholy rites.

153. The drum of the water kelpie is heard by the credulous native in the echo of every roaring waterfall, and the wretch drowning in the overflowing torrent is dragged under the rushing wave as the highly coveted food of the malicious spirit of the deep. Divers plants and herbs possess the most baneful properties and qualities, and a bunch of the Fegain grass, if skilfully cast upon the person of an obnoxious enemy, produces dire disease, sickness and death.

154. Sorcerers and necromancers attaining the respectable age of 4 and 500 years, exist in numbers in this land, flitting through the air and riding upon the wings of the wind at pleasure, and unbidden and invisible guests, eating the best and drinking the choicest liquors on the festive board.

155. "*Thavqnan*," the great sorcerer of modern days, is looked upon with universal dread, and his last public act is still fresh in the memory of the present generation. He had for a long time indulged his palate, and enjoyed his place unseen at the king's own table, but being at

length informed against by one of his malicious fraternity, he was by means of a strong spell exposed in the fact, and ordered to instant death. "Grant me but my life," he exclaimed, "and I will explain to your Majesty this grand master-stroke of my powerful art." The curiosity of the monarch was excited, and a large vessel of water which had been requested was set before the magician. Placing his hand in the liquid, he addressed the king: "Oh descendant of the race of Solomon, the wit of thy illustrious father is dull in comparison with the wisdom of the meanest disciples of Arobal, I defy thy myrmidons and thyself," and cleaving the air as he uttered these words, instantaneously disappeared from the gaze of the astounded and crest-fallen court.

156. *Arobal Mammoo*, the king of the Genis, is supposed to reside in the depths of the large lake in Mans, called *Moofat Wuha*. In the bosom of its placid water his palace is placed, constructed of the usual fairy materials; coloured cloths abound in every apartment, and his drums are heard pealing from the centre of the lake, when famine, war or pestilence is about to visit the land. Any one desirous of studying the black art after destroying his *mahtab*, (the badge of Christianity,) and treating the emblem of faith with certain irreverences, proceeds into the depths of the waters, is met by the genius, and kindly instructed in the arts of magic and necromancy; after a lapse of time he resumes his blue silk cord and is suffered for a time to exercise his supernatural power upon earth, but his knowledge gradually decays, it cannot be resumed, and the sorcerer again sinks into the uninteresting character of an Abyssinian Christian, without even the usual conclusion of having lost his soul, or being in the end carried away in the talons of the foul fiend.

157. It is fully believed, that one of *Arobal's* disciples succeeded by the power of his medicines in transferring all Asfa Wassun's concubines to his own harem, and having been seized and remonstrated with on the gross impropriety of his conduct, he behaved in the most insolent manner, and referred the proceeding entirely to the high assistance of his friend, the genius of the lake. In his extremity, he was deserted by the spirit, and the *crim. con.* being fully established, he was put to death by order of the king, and the misguided ladies brought back in durance vile to the palace; but his character for subtle medicines was fully established, as one of the concubines shortly afterwards de-

prived the monarch of his eye-sight by means of a powerful spell, which had been imparted by her learned paramour.

158. But the enchanted village of "Daska Stephanas," hid from mortal gaze, and enclosing upon earth all the pleasures of paradise, forms the never-failing topic of all wonder-loving souls; the poetic fancy of Abyssinia has been utterly exhausted in depicting this rare scene of delight.

159. "Its sleep-soothing groves with lawns between, are situated on the Nile, where released from the loose shackles of all marriages whatever, beautiful females are plentiful as they are common. Potent liquors flow on in never-ending streams, and the earth yields her spontaneous fruits without care or labour. But shrouded in the magic mist, these Elysian fields open their portals only to mortals of commanding form and handsome feature, on whom the glance of favor has been cast by the fair inmates of the enchanted garden; human endeavour is of no avail to unriddle the mystery, and the dread art of the sorcerer and his most powerful talismans, are alike unavailing to unloose the spell for the benefit of any of those unfortunates on whom nature has bestowed a tortuous figure, or an ill-starred visage."

160. The blacksmith is also endowed with supernatural powers by the credulous Abyssinians, and is supposed to be able to transform himself at pleasure into the likeness of a wolf or hyena; the cunning practice being in common use amongst the craft of secretly encasing the whelp of one of these animals in a metal collar, which being retained in after life, strengthens in the eyes of the uninitiated the fabulous stories in circulation.

161. The presence of any Christian emblem, badge, or portion of the Holy Scripture is supposed to neutralize the handicraft of the dreaded artist. The metal cannot be wielded in sight of the cross, and will by no means assume the required design, should any scrap of the Bible be worn on the person of the bye-stander. Whilst fumbling with their imperfect instruments to transform a bar of iron into the necessary repair of one of the galloper guns, the small draft of air which proceeded from the tiny bellows, proved insufficient to heat the metal, and the native artists' smelters declared aloud, that the phenomenon was consequent on the presence of some holy charm. Badges and emblems, charms and amulets were incontinently stripped off by all; the labour

was renewed without any better effect, and the smiths stood aghast at the enchanted bar which would not become heated.

162. The large forge bellows of the Embassy was produced, and a sufficient blast being obtained, the assembly were ordered to don all their paper preservatives and stand round the anvil, the sparks now flew under the brawny arm of the European, and the job was forthwith completed, to the utter dismay of the Abyssinian magicians, who came privately to request, that no further public performance of the sort might henceforth take place, as their name and glory would entirely depart from the land.

163. Sickness and misfortune are attributed to the effects of the evil eye of the Bondak. Long consultations are held to discover the person whose sinister look has imparted the calamity, and when the suspicions have gradually settled into conviction, the most implacable hatred is ever afterwards entertained towards the dreaded personage, and although concealed under the guise of indifference, which the savage can so successfully assume, yet the opportunity of revenge is never lost sight of, and the sweet morsel is obtained in some underhand dealing of after-life. Dedjmatch Harloo, the father of the Dedjmatch-ou-lie, added much to his notoriety by the extermination of all the Bondaks he could lay hands upon. Superstition exulted in a reeking hecatomb of human victims, and the love and veneration of his subjects knew no bounds on his last summary act of collecting together, and roasting to death 1300 of these miserable wretches, who were supposed to possess the influence of the evil eye.

164. The Abyssinian contrives to fill up his craving stomach, and in general possesses a sufficiency of covering to preserve him, after his fashion, from the inclemency of the weather. The climate is indifferently good, and the earth yields her treasures without much fatigue or bodily exertion, but the food is not of the best description, the style of life and habitation most uncomfortable, and all combine to engender the seeds of disease and death, and to reduce the limit of existence to less than three score years and ten.

165. Elephantiasis is known in its most loathsome forms. Ophthalmia seems to be common, and syphilis is met with in some shape or other on every second individual. • Leprosy is rife among the community, and the mountainous nature of the country renders the atmosphere sufficiently damp and cold for the location of rheumatism and catarrh;



altogether the inhabitants are decidedly open to all the ills to which flesh is certain heir in the most favored part of the globe, and they do not possess the more civilized means of alleviation.

166. Medicine is yet in its infancy, and charms and amulets, and sacrifices are resorted to, in the hour of sickness. The potent purgative, *cosso*, is applied to on almost every occasion, and its debilitating effects no doubt lead to shorten life. Paddling about in the mud with naked feet, and exposing the bare head to the sun, the blast and the tempest without any reference even to comfort, cannot prove conducive to health, and residing in frail fragile tenements amidst dirt and vermin, and surrounded by filth and putrefaction, must have the most injurious effect upon the constitution. The low regard with which all females are entertained, debars the enjoyment of conjugal affection. The want of education denies the profitable and pleasant employment of leisure time. Coarse fare is the general lot; little amusement or holiday vary the dull monotony of life, and bullied by the Church, the king, and the nobles, a short existence is passed in this world in no very great happiness or comfort, and the spirit passes away without any very distinct idea of what is to happen in the next.

167. Compared with the other nations in Africa, Abyssinia certainly holds a high station, superior in arts and agriculture, in law, religion and social condition to all the other benighted swarthy children of the sun, and the portion of good which does exist, may be justly ascribed to the remains of the wreck of Christianity, which although stranded upon a rocky shore, and buffeted by the storms of ages, still continues to contain a few precious gems amidst the overwhelming mass of sand and sea spume.

168. But the misery, the filth, and the moral degradation in which she vegetates, sinks her far below the level of any European nation, and the parent land remains obscured in the fogs of her original barbarity, whilst the morning sun of intelligence has in the mean time lightened upon the social existence of her remote colony:* nay she has even

* Customs rarely alter in a country so entirely isolated as Abyssinia, and where the influence of new ideas cannot lead to the perfection of the arts and sciences, and many of the present usages in the land would, in some measure prove what the Ethiopians affirmed in the time of Diodorus, that Egypt was originally one of her colonies; the very soil and earth being brought down from their plateaus by the flood of the Nile,

retrograded from her pristine state, and the great empire of Ethiopia has long since cracked and fallen to pieces. The shadow of a mighty name, the pagans have overrun her fairest provinces. The Christian chiefs of every district madly strive for superiority, and the great horrors of war are only averted by the imbecility of the national character. Still monks and priests and aged men are wantonly put to death. Houses and villages sacked and destroyed, and the stream of oppression rises hot and heavy from every quarter of this distracted country. The property, the liberty, and the reputation of the subject are entirely at the caprice of the ruler, domestic ties and affection are little known or understood; small comfort is enjoyed in the transactions of private life; the debasing effect of extended slavery holds firm footing upon the mind; superstition shrouds the land in her thick veil; and the day seems to be yet far distant, when she shall stretch out her hands to heaven, and be at peace with her Maker.

169. In arts, in industry, and in moral existence, Abyssinian Shoa remains indeed secluded in a dense cloud of darkness; her agriculture is the only redeeming feature, but the fertility of the soil is rather to be praised, than any great advances she has hitherto made in the science of husbandry.

170. Manufactures are restricted to the supply of the most simple wants: a coarse cotton cloth to cover nakedness, a skin of leather to serve as a bed, a mat basket to contain the most necessary food. The gold and silver ornaments are certainly made with some taste, but being solely for the benefit of one individual, cannot be thrown into the balance of the national account, and the little that is understood extraction of the metal from the earth evinces great imperfection of talent.

and there existing at that time a striking resemblance in many of the customs and laws of the two nations, each giving the title of Deity to their kings. The funerals in either country being performed with equal care and splendour; the writing in usage being the same in both countries; and the knowledge of the written character retained solely among those belonging to the priesthood. In both countries there are monasteries and religious colleges organized after a similar fashion, and those who are consecrated to the service of God, are supposed to practice the same rules of abstinence and sanctity; they are dressed alike, and have shaven heads, their kings wear the same description of robes and ornaments. The hair of the commoners is still dressed after the fashion depicted in the ancient Egyptian designs, and the use of sandals fabricated of leaves, which is recorded in ancient Egyptian story, is to this day extant in Abyssinia.

171. The difficulties and perils of the journey, and the unsettled state of the country, oblige to travel in caravans, and the slow tramp of the wearied mule, and the foot-sore slave, render commercial intercourse dilatory and of rare occurrence. Salt its still the great staple of importation, together with a few beads and coarse Arabian manufactures, and the return, which is made in grain, cloth and slaves. is certainly neither to the profit, nor to the increased enlightenment of the Abyssinian.

172. All the accommodations of life are simple and limited ; the houses are mere stakes badly plastered with earth, and afford little shelter from the elements, while the internal arrangements are equally rude and scanty.

173. The intellectual features present a peculiar deficiency. Few can read the character, and still fewer understand the meaning of the manuscript. The educated priests for the most part learn like the parrot, by rote, and rant at the top of their lungs, passages of which they know not the sense. The utter ignorance of the laity is truly deplorable : few can spell out a line during an hour's severe exertion, and none can write three words together. Their books are all of a sacred nature, and being written in an unknown language, are looked upon in the light of charms, specially if well bound and filled with pictures ; and although the kiss of debasing superstition be imprinted upon the colored daub, the intellectual vision remains unlit by the words of the text.

174. Poetry and painting are in their veriest infancy. Music has been ushered into existence a deformed monster ; and architecture still remains unbegotten in the dark abyss of Abyssinian ignorance.

175. In religion they are debased, superstitious, and bigotted, believing the most absurd and ridiculous doctrines, and resting their only hope of salvation on fasts and pilgrimage, on confession and priestly absolution.

176. In private life their character is equally despicable, and they have strangely contrived to accumulate all the vices of civilized as well as of savage life, and have succeeded in retaining but few of the virtuous traits of either. Nay, their very existence is the vegetation of a noxious weed in the foul kennel ; but the refinements of civilized society have not as yet supplied the beauties of original simplicity. The box of

Pandora has indeed been doubly locked after allowing all the scourges of mankind to escape with their full muster of attendants, and all the horrors of savage warfare, of merciless slavery, and of debasing despotism ride triumphant over the land.

177. Cowards, fanatics and liars ; cruel, superstitious and profligate ; proud of their deformities, and constant only in their inconstancy, they are bullies and beggars of the most transcendant character, whilst their dirty unclean habits render them a perfect nuisance to all with whom they come in contact ; glorying in the most savage, revolting and barbarous practices, which are hardly credible, except to eye-witnesses, their life is at complete variance with all the ordinary customs of other people. Brutalizing, like wild beasts on raw bloody flesh, when others have adopted the spit and the kitchen fire ; wearing no protection on the head and their feet, when all others having long since proclaimed the necessity of the covering ; exposing their naked persons as a sign of respect, contrary to every received law of shame, and existing in all the filth of unwashed persons and dark unswept hovels, they have indeed but little cause for the inordinate self-pride in which they hyperbolically style their petty location the finest of countries, and its unclean inhabitants, the only true Christians in the world.

History of the Abyssinian Church.—English Missions.

The departure of the Jesuit Patriarch was followed by a fierce persecution of all who were in any degree tainted by the abhorred faith of the Romans, and the last legacy of the western priest proved a fatal gift to the possessor. Suspected individuals wherever found were immediately put to death, and in accordance with the earnest entreaties of the population, and with the long established usage of Ethiopia, a new Abuna was appointed from Egypt, to preside over the ancient religion, now firmly re-established throughout the land.

But the failure of the ambitious designs of the Church of Rome had in Europe been entirely ascribed to the arrogance and cruelty of the emissaries employed, which had created so deep and lasting a hatred among the mass of the inhabitants ; and the milder order of French

Capuchins was accordingly put in requisition to bring about the desired re-union with the heretic church of Abyssinia. Six chosen men of the order, fully provided with the firmans of protection from the court of Constantinople, were first entrusted with the enterprize during the middle of the seventeenth century, of these four succeeded in penetrating into the country, but only to suffer the martyrdom of St. Stephen, and the remaining two, terrified at the fate of their unfortunate brethren, returned without hope of success to their monastery in France.

The zeal of the order nevertheless made one further effort in the cause, and again three doomed friars landed at Snakem, whence they despatched a letter to congratulate the Emperor on their safe arrival in his vicinity. Instead, however, of the anticipated presents, and means of conveyance to the court, an order for their execution was received by the governor of the town, and the stuffed heads of the fathers were forwarded for inspection, that the fair skin and the tonsure of the foreign priest might be fully recognized, and the promised reward be claimed by the inhospitable Pacha of the Coast.

Poucet's interesting descriptions still remain to commemorate a further quest which in 1700 was undertaken, in company with a member of the Society of Jesus; but the partner of his journey died in Nubia, and many doubts have been reasonably entertained regarding the truth of the physician's narrative. Matters are painted with more than travellers' license, and the imagination freely drawn upon for facts that never existed. The close of his career also served to throw a deep shade of disbelief over the minds of even the most credulous; for after receiving from the French monarch magnificent presents for the Emperor and Court of Abyssinia, he crossed the Red Sea, and penetrating into Persia, died at Ispahan, with the character of being a perfect impostor.

A last attempt was made a few years subsequently by Pope Clement XI, and four German Franciscans were despatched in the cause of Rome to the country of the intractable Abyssinian. The poverty of these missionaries, and the humility with which they refused all temporal wealth, touched the heart of the reigning emperor, and although he forbade them to preach in public, he pledged himself to protect their lives and promote the cause of their mission. "Your work is difficult," said the monarch, "it demands time, and you must be prudent, and not

arouse the prejudices of the people ; God did not create the world in one moment, but in six days."

Finding secret admission into the houses of many individuals, the Jesuits were beginning to gain ground, when the monks and clergy, who had suffered the most severely during the former struggle, raised an outcry, that the Europeans were the enemies of the Mother of God, and had blasphemed her holy name. The tumult became universal, and a powerful conspiracy was arranged to poison the friars, and dethrone the emperor. David, a young prince of the imperial family was called to the throne, and the unfortunate missionaries having been dragged from their place of concealment, were condemned to forfeit their lives.

On being offered a free pardon if they would abjure the Roman faith, the last martyrs to the cause indignantly rejected the proposal, and the young monarch struck with their devotion and endurance under severe and perilous trial, commanded that they might be banished from the land ; but the monks preferred stoning them to death, and the event accordingly took place in the year 1718.

So ended the ardent endeavours to substitute one superstition in the room of another. Time, and life, and means, had been wantonly expended, that the triumphant chariot of Rome might grind over the neck of the Abyssinian ; but the costly sacrifice was impotent, and the ambition of binding a far country in the fetters of spiritual slavery sunk deservedly to nought.

Another century rolled on before the Christians of the West bestirred themselves in the cause of enlightenment. The Apostolic Church had fallen from her high place, and it was reserved for the members of another faith to carry the glad tidings of salvation to the benighted people of Ethiopia.

The great traveller, Bruce, had now for ever broken the mysterious seal of ignorance which had hitherto bound the land as with an iron zone, and his Abyssinian friend and companion, the learned Abraham, after ten years of patient industry, had completed his pious labours. A translation of the Holy Scriptures was faithfully rendered into the popular language of the country, and the precious document was purchased in 1818, by the Bible Society of Great Britain.



The Reverend Messrs. Gobat and Kugler first penetrated into northern Abyssinia, and established their residence at Adowa, and the Reverend Messrs. Kraff and Isenberg, followed in the same path.

The words of the true Gospel were listened to by the natives with every attention, and amidst a scene of universal corruption, the pure lives of the preachers were beheld with amazement. But intrigue and foreign influence produced a revulsion in the mind of Aubie, the tyrant prince of Tigré, and the order for departure to the coast was enforced by the governor of the town, who was anxious to possess himself of property, that could not be removed from his avaricious grasp. Their names, nevertheless, remain in the land, and to this day the English missionaries are spoken of with the greatest reverence, as possessing every quality that was good, mild, and just.

Ardent zeal in the cause of Christianity again induced Messrs. Isenberg and Kraff to brave the dangers of an unexplored route through the fiery desert of the inhospitable Adaiel, and to endure the foul annoyance of a savage existence. The kingdom of Shoa now forms the theatre of their praiseworthy exertions. Dogmatical treatises have been ably penned in the vernacular language of the country; a school in the capital extends to the rising generation the means of improvement, and the example of a holy life will no doubt produce a happy effect.

But the uphill task of the missionary is indeed hard, and the wonder is, that any thing has been accomplished, and not that the harvest is scanty. Disliked as a stranger of envied accomplishments, despised as an alien to the land, and hated by the ignorant and bigotted priesthood, the words of truth fall unheeded from lips the most eloquent, and the most zealous endeavours prove of little avail. Perfectly satisfied with his own creed, the Abyssinian finds it easier to kiss the holy book than to peruse its contents, and to trust to the priestly absolution, instead of moulding his conduct according to the doctrines of pure faith. The rude artizan is esteemed of higher importance than the erudite Missionary, and blinded by the grossest superstition, engulfed in a sink of bestiality, and wedded to the manners, the customs, and the doctrines which are diametrically opposed to the evidences of the Gospel, it is not until the arts of civilized society shall have been introduced, and the neck of the self-sufficient Abyssinian bent under the superiority of the

stranger, that the barrier can be finally overcome, and one step be gained towards the restoration of the unhappy country of the true word of God.

The constitution of the church, the second great power of Shoa, is simple, and the sway over the public mind seems to be the effect rather of individual power than of a public body. Few lay men attend a chapel unless on the festival of their own saint; but all present offerings according to their means, and whilst few peruse the Holy Scriptures, every great man entertains in his house a priest in the capacity of father Confessor. In every clerical conclave, the king possesses the supreme voice of authority, and as from him proceeds, in a principal measure, not only the more temporal comforts of bread, beef and hydromel, but also punishments for real or fancied delinquency; the despotic monarch may here be justly regarded as the head of his own Church.

The Abuna or Archbishop is, however, the real spiritual chief of Ethiopia; consecrated by the Patriarch of Alexandria, and possessing with rich revenues, the intelligence of other lands: he is universally feared and respected throughout the empire, and all religious differences and dissensions must be carried for his final decision. Princes and rulers pay implicit deference to his high behest, and seated on the ground before his episcopal throne, receive, with the utmost respect, his every wish and advice.

Feuds and quarrels betwixt state and state are satisfactorily arranged in his presence, and war, tyranny, and violence are controlled by his commanding voice of mildness and benevolence. But the extent of his diocese is great, and many local difficulties oppose the pastoral visit to the extremities of his See.

The wild Galla, the bigot Moslem, and the pestilential morass, intervene in every direction, and the kingdom of Shoa, peculiarly insulated by these obstacles to access, has for ages been deprived of the advantages accruing from the residence of an Archbishop.

In the hands of the Abuna are vested the exclusive power of consecration. Bishops, priests, and deacons can from him alone receive holy office and function; and before assuming the clerical crook and cloak, the inhabitants of the most remote provinces must invariably repair to his court to undergo the requisite examination, and receive the indispensable blessing and authority. He only it is who grants ab-



solution for heavy offences against either God or man, and the ark of a church, whether newly constructed or polluted by the unhallowed touch of a Mahomedan, must be purified by his hands, with the holy *merom*, before being entitled to that high adoration which it thenceforward receives.

The second place in spiritual dignity is filled by the *Cheggrie*, the head of the monks, seated on the throne of Tekla Haimanot, one of the first founders of the orders of seclusion. He engrosses the management of all the various monastic establishments throughout the empire, and in his hand remains the charge of existing literature and education. Deeply versed in the subtleties of theology, his opinion is held of the highest import in the never-ceasing disputes upon the uninteresting subjects of false faith, which occupy the mind of the Abyssinian divine; but his authority extends only to the simple admittance into the monkish order, and to granting absolution for the minor offences of evil thought and prescribed fasts neglected.

The offices of the *Comus*, or Bishop, who ranks next above the common priest are few and simple. Without diocese or even authority over the inferior members of the Church, his peculiar function is to bless and purify the sacred ark, should it accidentally receive the impure touch of the deacon or layman, to repeat the prayer of admission, and sign the cross on the skull cap of the candidate for the monastic seclusion, and to afford absolution for trivial offences against the conscience.

Ignorant, bigotted, and licentious, the priesthood of Shoa are restrained under little rule or authority. The beauty of morality influences not their conduct, and punishable only by the king, or by their own brethren vice, excepting of the most flagrant nature, and resounding through the voice of an indignant people, is screened by the fellow-feeling of the sympathizing judges. Their number and cause might effect high power in the realm, but indolence and dissolute habits counteract the influence; and contented with the outward mark of respect from a besotted multitude, and enjoying a fair proportion of the good things of this world, they give little heed for the care of souls, either here or hereafter.

But in order to obtain the desired and enviable position of eating the bread of comparative idleness, a sacrifice is indispensable. The priest is restricted to the possession of one single wife, and on the demise or infidelity, no second marriage is authorized.

A small portion of labour must moreover be endured, the psalms of David must be carefully conned, and the mysteries of Abyssinian song and dance be fully penetrated before the sacred office can be obtained. The lessons of early youth are, however, soon forgotten, and the constant repetition of the same words, removes the necessity of retaining the character. Few in after-years can read, and still fewer respect the vow of celibacy ; and the morning hours of the Sabbath and of the holidays, employed in dancing and shouting within the walls of the church, entitle the performer to all immunities, and comforts pertaining to holy orders.

Divine service within the precincts of the sacred edifice is limited to the delivery of a passage of the Gospel rendered into ancient Greek, a language long since dead throughout the land. Psalms are bawled at the extremity of stout lungs amidst capering and clashing of timbrels ; the miracles of Saint Mary and of St. George are chaunted, and the worship is invariably concluded by an equitable division of the consecrated bread, which remains from the morning communion.

The rite of baptism is performed in an adjacent building, and the solemnization of matrimony is rarely resorted to in the land ; but the death and the funeral feast are studiously attended, with much advantage to the temporal interests of the church. The choicest food is unsparingly dealt out to all, and the bereaved widow is glad to leave the management of her affairs to the assiduous father confessor. The dying man bestows a portion of his estate in this world for the bright hopes which absolution extends in that which is to come, and the holy sacrament is even administered after the soul has quitted the tenement of clay, in order that the superstition of grateful relatives may grant a rich reward for the blessing of the priest, and his undeniable assurance of exemption from the pains of punishment hereafter.

Deacons are usually chosen from among children of tender age, and on reaching maturity the life of the adult is not distinguished by the spotless purity of his duties in the office. The functions of these juvenile noviciates are light, it is theirs to be present during Divine service in the capacity of servitors and assistants, to complete the requisite number at the celebration of the holy communion, and to guard and preserve the sacred ark in case of accident by fire or water.

This mysterious casket is an object of all-engrossing adoration, and in its presence consists the only sanctity of the church. All prostrate

themselves to the ground, as the box, which resembles the Jewish ark, is carried in procession through the street, and when replaced in its case in the holy of holies the air is rent by the attendant priests with shouts in the temple of the eternal God.

Fasts, penances, and excommunications form the chief props of the clerical power ; but the repentant sinner can always purchase a substitute to undergo the two former, and the law of the Church is readily averted by a timely offering. Spiritual offences are indeed of rare occurrence, for murder and sacrilege alone give umbrage to the easy conscience of the Abyssinian, and all other crimes written in the book of Christian commandment have been well nigh effaced from the surface of the tables. The nation is by no means religiously inclined, and the strict observance of weekly fasts, with suitable largesses to the priest and mendicant, are quite sufficient to ensure the requisite absolution for every sin committed in the flesh.

The churches are in general very miserable edifices of wattle and mud plaster, distinguished from the surrounding hovels by a thin coating of whitewash, which is dashed over the outside, to point with the finger of pride to the peculiar privilege of the two great powers in the land. Circular in form, the wretched thatch is surmounted by grasses glittering with brass and ostrich eggs, whilst the interior decorations are guided by the same depraved and heathenish taste.

Eight feet in breadth, the first compartment stretches after the fashion of a corridor, entirely around the building, and being strewn throughout with green rushes, forms the scene of morning worship. To the right of the entrance door is the seat of honor for priests and erudite scribes, and beyond this court, save on certain occasions, the bare foot of the unlearned layman cannot pass.

The uncleansed walls are festooned with ancient and dingy cobwebs, no inappropriate drapery to the wretched daubs which serve to cover the mud, and are designed to represent St. George and his green dragon, the patron saint of the church, the blessed virgin, and a truly incongruous assemblage of cherubims and fallen angels, with the evil one himself enveloped in hell's flames.

A dark inner compartment forms a last separation from the holy of holies which contains the sacred ark, and is completely shrouded from sight by the screens of glaring cotton cloth. Timbrels and crutches de-

pend in picturesque confusion from the bare rafters of the roof ; no ceiling protects the head from the descent of the lizard and spider ; and the *tout ensemble* of the Abyssinian church presents the strongest mixture of slattern finery and of squalid filth.

Certain revenues and estates are set apart for the support of each clerical establishment, and to ensure the proper distribution, an *Alaha*, or chief, is elected by the monarch from either class of society. Whilst a successful foray is followed by liberal donations from the throne, the safe return from a journey is acknowledged by an offering on the part of the private individual, and the shade of the venerable juniper trees which adorn the church yard, is ever crowded with groups of sleek hooded priests, who bask in the enjoyment of idle indulgence.

Loss of office is the great punishment inflicted by the spiritual court, which is composed of the assembled members of the individual church, and degradation is followed by the expulsion of the offending brother from the community. But the imperial hall of justice is no unfrequently graced with the presence of the refractory priest, and fetters in the dungeon, or banishment from the realm, maintain a wholesome fear of the royal power of investigation in matters ecclesiastical.

Monks swarm throughout the land, and the huts of the monasteries are always pleasantly situated in the depths of some shady forest around the church dedicated to the patron saint. Fields and revenues still remain in the possession of these orders, notwithstanding that the duties for which they were originally assigned, are now seldom performed. Education was in former days to be obtained alone from the inmate of the monastic abode ; and a life of scanty food, austerity, and severe fastings was embraced only by the more enthusiastic. But the skin cloak and the dirty head-dress now envelop the listless monk, who satisfied with a dreamy and indolent existence, basks during the day on the grassy banks of the sparkling rivulet, and prefers a bare sufficiency of coarse fare from the hand of royal charity, to the sweeter morsel earned by the sweat of his brow.

The monk is admitted to the order of his choice by any officiating priest. A prayer is repeated, the skull cap blessed with the sign of the cross, and the ceremony is complete. But a more imposing rite attends the oath of celibacy before the Abuna. Priests assemble in numbers

and fires are lighted around the person of the candidate. His loins are bound about with the leathern girdle of St. John, and the prayer and the requiem for the dead rise pealing from the circle. The Glaswa, a narrow strip of black cloth adorned with colored crosses, is then placed on the shaven crown and shrouded from view by the enveloping shawl, and the Archbishop, clad in his robes of state, having repeated the concluding prayer and blessing, signs with his own hand the emblem of faith over the various parts of the body.

But Abyssinia possesses no idea of the more salutary doctrines of Christianity. Polluted faith is here reflected in the mirror of her depraved manners; and long, severe fastings constitute the essence of her degenerate religion. The idol worship of saints has made rapid progress in the land, and the ignorance of her clergy is only to be equalled by the impurity of the lay classes. Their belief in Christianity, if that term can be applied, is strange, childish and inconsistent; and bigoted to the faith of their ancestors, they abhor and despise all who refuse to sign this, their absurd confession.

“That God created all religions in the world and that each is perfect of its kind except that of the Shankala, but that separate places are prepared for each creed in Heaven.

“That the Alexandrian faith is the only true belief.

“That faith together with Baptism, are sufficient for justification, but that God demands alms and fasting, as amends for sin committed prior to the performance of the baptismal rite.

“That unchristened children are not saved.

“That the Baptism of water is the true regeneration.

“That invocation ought to be made to the saints, because sinning mortals are unworthy to appear in the presence of God, and because if the saints be well loved, they will listen to all prayer.

“That all sins are forgiven from the moment that the kiss of the pilgrim is imprinted on the stones of Jerusalem, and that kissing the hand of a priest, purifies the body from all sin.

“That sins must be confessed to the priest, saints invoked, and full faith reposed in charms and amulets, more especially if written in an unknown tongue.

“That prayers for the dead are necessary, and absolution indispensable; but that the souls of the departed do not immediately enter upon



a state of happiness, the period being in exact accordance with the alms and prayers that are expended upon earth."

All ideas regarding salvation are indeed vague and indefinite, and vain, foolish doctrines have taken entire possession of the shallow thoughts of the Abyssinian. Born in falsehood and deceit, cradled in bloodshed, and nursed in the arms of idleness and debauchery, the national character is truly painted in the confession of one of her degraded Sons: "Whensoever we behold the pleasing ware, we desire to steal it, and we are never in the company of a man whom we dislike, that we do not wish to kill him on the spot."

Throughout the land the basest superstition reigns triumphant. The kiss of adoration is imprinted on the external pillar of the Church, and men proceed on their way in perfect security of the protection of the patron saint. The unwilling female is driven to the Communion Table only as a test to suspected infidelity. The preservation of a fast, and absolution accorded by a licentious mortal, form the first grand principles of the religion of Shoa, and it would indeed prove a far easier task to sweep from off the face of the land, the present meretricious fabric, and to raise up a new temple in its stead, than to attempt the Herculean labour of cleansing, as it now stands, the impurities of this Augean stable.

(Signed) D. C. GRAHAM, *Captain,*
Principal Assistant to the Embassy.

Rites and Practices of the Abyssinian Church, which appear to have been adopted from the Jews.

A lengthened detail of all the absurd confusion of doctrines which prevails in the church of Shoa, would prove neither pleasant nor profitable to the reader, and may moreover be perused in the learned dissertations of the Jesuits; but those rites and practices which the Abyssinians appear to have adopted from the Jews, are well worthy of remark, and we here insert them as a sequel to fill up the blank in the foregoing sketch of the Church History.

It is a matter of high importance to separate the manners and customs which a nation has borrowed, from those that she has produced during the advance of time within her own pale; and from an adequate knowledge of her self-activity, some idea may be formed of the station to which Ethiopia may be admitted within the ranks of civilization; and of the expectations that may reasonably be entertained in how far her efforts could be rendered subservient towards the improvement of the moral and political state of benighted Africa.

Surrounded by many hostile tribes, and secluded from enlightened intercourse since the capture of the Upper Nubia by the Turks, and the possession of the Red Sea by their numerous fleets, Abyssinia has retained her customs with little alteration since the sixteenth century, although that slight modification may be observed, which is not uncommon in the general history of mankind. During the fresh cruelty of the successful invader, national rites and practices are maintained with more than wonted steadfastness; but when the first violent assault of enmity has yielded to a more quiet intercourse, a mutual interchange is admitted between the contending parties, and thus the Jew, the Moslem, and the Pagan have each in their turn contributed to the general stock of Ethiopia.

Many circumstances, however, have continued to render the Abyssinian nation peculiarly susceptible of Jewish ideas and influence; and the abilities of her learned historians have in vain been racked to devise the most becoming legend, by which to account for the introduction into the empire of such a multiplicity of Hebrews.

In accordance with endeavours of other nations to derive their ancestry from demi-gods and heroes, the kings of the country boast a direct descent from the house of Solomon, and flatter themselves in the name of the wisest man of antiquity.

The high sounding title of king of the Israelites is added to that of Emperor of Abyssinia, and the motto of the national standard floats on the breeze—"The Lion of the tribe of Judah hath prevailed."

"The Queen of Ethiopia" says the tradition, "whose name was Alaqueda, had heard from the Merchant Tamerin, of the wisdom and the glory of the son of Sirach, and resolving to visit him in his own country, she proceeded to the land of Israel, with all the rich presents that her empire could afford.

“After a season the royal body returned, and her son Menelech, the result of her visit to the greatest potentate of the age, was born, and in due time transmitted to his august sire. The young prince was duly instructed in all the mysteries of Jewish law and science, and being anointed king, under the name of David, he was returned to his own land of Ethiopia, escorted by a large suit of the nobles of Israel, and a band of her most learned elders, under the direction of Ascarias, the son of Tradok, the High Priest.

“The gates of the temple of Jerusalem were left unguarded, and the doors miraculously opened, in order that the holy ark and the tables of the Law might without difficulty be stolen and carried away. The journey was prosperously performed, and the Queen Mother, on resigning the reins of authority to her son, caused a solemn obligation to be sworn by all, that henceforward no female should hold sway in the land, and that none but the issue of David should sit upon the throne of Ethiopia.”

Although this tradition may in itself be considered inconsistent and improbable, the firm belief in the origin thus traced, will in a great measure account for the general inclination and consent to receive Jewish rites and practices, as they were in process of time presented.

The fable of Queen Maqueda was in all probability the invention of fugitive Jews, who after the destruction of Jerusalem by the Emperor Titus, emigrated to Ethiopia by way of the Red Sea, who disseminated the tradition with the design of obtaining the desired permission to settle in the country, and whose descendants, under the name of Falashas, are still extant among the mountains of Simien and Lasta.

The real queen of Sheba or Saba, known to the Arabs under the title of Belkis or Nicanta, reigned over a portion of Arabia Felix. Want of geographical information and inquiry perpetuated the error of antiquity, which extended Ethiopia to Arabia; and the Sabacans and Homerites, who inhabited the Southern portion of the land, are frequently confounded with the swarthier sons of Africa.

But the queen of the South, who came to hear the wisdom of Solomon, brought along with her the produce of her own country; and camels and spices, gold and precious stones, pertain not unto Ethiopia. The first Christian Missionary found the inhabitants of Abyssinia idolaters and worshippers of the great serpent Arwe; whereas, according to

tradition, the Jewish faith had been for ages established firmly in the empire.

No Hebrew literature remains to support the legend. The Holy Scriptures were not even translated into the language of the country. No connexion was in after-times maintained with the land of fellow-faith, neither was any assistance afforded in the day of her distress, when Israel suffered under the despoiling hand of the Abyssinian and the Babylonian, and bent her oppressed neck to the yoke of Egypt and of Rome.

The family of Menelech Ibnel Hakim are stated, in the *Kebra Negest*, the glory of the kings, to have possessed the throne in uninterrupted felicity until the year 960, when the massacre of the issue of Solomon was perpetrated by the woman Essat, and one solitary prince of the blood royal alone escaped to take refuge in the distant and loyal province of Shoa. During the succeeding four hundred years, it is asserted by the learned historians, that the usurping rulers of the fairer provinces of the empire were Jews, who exerted their utmost endeavours towards the propagation of their religious creed, and that when the legitimate dynasty was again restored under Ican Amlac, the Hebrew prejudices had taken too deep a root, to be easily eradicated from the mind.

But the names and histories of many of these usurpers still remain to confute the tale; and although in furtherance of political objects, privileges might have been granted to the numerous Jews residing in the country, it does not appear that the party ever gained sufficient preponderance to place one of their own faith upon the throne, and thus the origin of the existing rites must take a humbler flight to be in union with the truth.

Ignorance is indeed too glaring a feature in the character of the nation, and remains a monument of the first conspicuous fruit of her delight in the confusion of truth and falsehood; superstition required the consistence of fable, and learned doctors of the law became robbers of the temple. The conscience was not galled by the fabrication of ten thousand miracles, which stain the pages of her Church History, and the honor of Ethiopia triumphed in an origin, which was ascribed to base illegitimacy and intrigue.

The ancestors of those Jews who to the present day exist in Abyssinia, arrived long before the nation had embraced the Christian religion,

and in their attempts to obtain moral influence over their Pagan hosts, were far from being inactive in their adopted home. The early Christian church, that of Egypt especially, having embraced many Hebrew customs, was now introduced into a country, where similar doctrines and practices were already in use, and hence it arose, that the population so readily became converts.

In process of time the Jews increased in numbers, and a consequent augmentation of influence was obtained over the fickle mind of the Abyssinian. Christianity was wanting from the beginning, and their claim to the appellation of "*Habeshi*," a mixed and mixing people, was never more aptly exemplified than in the strange medley of religion which resulted in the confusion. A mixture from different nations—as stigmatized by the original term—they have garbled the faith of all their ancestors, and there is assuredly no Christian community in the whole world, which has jumbled together truth and falsehood with such utter inconsistency as the vain church of Abyssinia.

With the destruction of the race of Solomon, the Jewish party obtained the preponderance, because their assistance was indispensable to the usurper. Again, on the restoration of the legitimate dynasty, they were hunted among the mountains as a race accursed, and the feeling reigned paramount to sweep the wanderers from the face of the land. But the custom of ages had impressed the Hebrew practices too deeply to be removed. They were in fact regarded in the light of orthodox Christian doctrines, and as might have been expected from a wicked, bigotted, and superstitious people, the severest persecutions were enforced against the members of another creed, without the Abyssinians observing in how far they were themselves tainted with those very principles, which in others they considered so justifiable to oppress.

The same restrictions which prohibited the Jews from partaking of the flesh of certain animals pronounced unclean by the Mosaic law, still heavily binds the stubborn neck of the Ethiopian. The act which is deemed disgraceful in the eyes of men is in itself firmly believed to be a moral transgression, and is visited, as was the case in the Mosaic institution, by the stern reprimand of the priest. The penance of severe fasting, or of uneasy repose upon the bare ground is enforced by the father confessor, to efface the taint of the interdicted animal; and prayers must be repeated, and holy water piously be sprinkled

over the defiled person of that sinning individual, who shall have dared to touch the meat of the hare, or the swine, or the aquatic fowl.

"The children of Israel did not eat of the sinew which shrank, which is upon the hollow of the thigh." This nerve is in the Amharic language termed "*Shoolada*," and it is prohibited and held unlawful in Shoa, more especially to the members of the royal blood considered as highly unclean; it ranks with the carrion carcase, and the universal belief prevails, that the touch of the unholy morsel would infallibly be followed by the loss of the offending teeth, as a direct proof of the just indignation of Heaven.

The Abyssinian cannot be brought to admit, that every creature of the universe being alike the work of the Almighty, must necessarily be clean, and that those which are not noxious to health can therefore be used for man's food, if accepted with thanksgiving towards the Creator. The liberal spirit of Christianity is indeed wonderfully clouded in darkness, and the stranger who professes its tenets, but withholds his subscription to the creed of narrow and fanatic ideas, is regarded as worse than the surrounding heathen, and condemned to eternal perdition.

The Jewish sabbath is moreover strictly observed throughout the kingdom. The ox and the ass are at rest; agricultural pursuits are suspended; household avocations must be laid aside; and the spirit of idleness reigns throughout the day.

Abolished by the orders of the great Council of Laodicea, the oriental churches were, after the observance of centuries, freed from this burden, and men gladly availed themselves of the ecclesiastical license to work on the Saturday. Here, however, the ancient usage agreed too well with the laziness of the people, systematically trained to indolence and sloth; and when a few years ago, one daring spirit presumed, in advance of the age, to burst the fetters of superstition, His Majesty the king of Shoa, stimulated by the advice of besotted monks, delegated his wardens throughout the land, and issued a proclamation, that whosoever disturbed the original dreary stillness of the Jewish sabbath, should forfeit his property to the imperial treasury, and his person to the State dungeon.

Ludoff, the celebrated Strabo of Ethiopia, most accurately remarks, that there is no nation upon earth which fasts so strictly as the Abyssinians, and that they would rather commit a great crime than touch food

on the day of abstinence. They not only boast, with the Pharisee, "I fast twice a week," but pride themselves also upon their mortification of the flesh during half the entire year; whilst the haughty and self-sufficient monk vaunts his meagre diet as the only means of expiation from sin and evil desire.

The Abyssinians, in common with other Christian communities who rigidly observe the fasts of Wednesday and Friday, advance as an argument, that the Jews seized our Saviour on the first of those days, and on the second carried into execution their design of crucifixion; but as this account differs from the evidence of the Gospel, which shews that the arrest took place upon Thursday, the observance is most probably an imitation of the weekly fasts in existence among the Jews.

The fast of the forty days before Easter is preserved with much greater rigour than any other in Abyssinia, and the reckless individual, who shall neglect the great *toma hodada*, cannot possess one sentiment of true religion in his heart. To the abstinence of this season especially are attached peculiar virtues, which completely nullify the effect of every sin that may be committed throughout the residue of the year.

According to the Jewish practice, all culinary utensils must thoroughly be cleansed and polished, to the end, that no particle of meat or prohibited food may remain to pollute the pious intention. Journeys and travels are strictly interdicted, and from Thursday until Easter moon, no morsel should enter the lip, and the parched throat ought to remain without moisture.

During the fast of the Holy Virgin, children of tender years are not even exempted from the penance of sixteen days; and during the many and weary weeks of abstinence which roll slowly throughout the entire year, the Abyssinian priest would grant no dispensation to the famished mortal, were he to receive an immediate mandate from heaven.

Sabela Selassie arose some years ago, a mighty zealot in the cause, and perceiving that the custom was beginning to decline, proclaimed, through the royal heralds, pains and penalties sufficiently severe to ensure the future strict observance of the fast. The commands of the defender of the Faith were however in one instance transgressed by a soldier during a military expedition; but his excuse of fatigue under a heavy load of the king's camp equipage was admitted; and although on similar occasions a certain license is extended, still the monarch pre-

serves a strict watch over the maintenance of church discipline, and delights to perceive the stranger imitating the hypocrisy of his own example.

All the absurd ideas of the Jewish Rabbins, regarding the dead, have been received and embraced by the fathers of Abyssinia. They maintain that the soul of the departed does not immediately enter into the kingdom of joy, but is conducted to an earthly paradise situated in an invisible spot between the heaven and the earth, where it remains until the resurrection in a state of happiness or torment, according to the alms and prayers bestowed by surviving relatives and friends. Niches in the same spot are also occupied by the saints, and the inconsistency of their faith fully appears in the belief, that the intercession of the Almighty is absolutely necessary of these very saints, who themselves require mortal mediation to be absolved from their spiritual imperfections, and to be suffered to rest in peace until the coming of Christ.

But the self-interest of the avaricious priest is wrapped up in the preservation of this doctrine. The clergy riot in the price of death-bed confession, and a corner of the church yard is sternly denied to all who die without the due performance of the rite, or whose relations refuse the fee and the funeral feast. The payment of half a crown, however, wafts the soul of a poor man to a place of rest; and the *tescar* or banquet for the dead, places him in a degree of happiness, according to the costliness of the entertainment. The price of eternal bliss is necessarily higher to the rich, but German crowns procure the attendance of venal priests, who absolve and pray continually day and night, and the reeking burial feast is frequently devoured in commemoration of the event. Royalty is taxed at a still more costly rate, and the anniversaries of the deaths of the six kings of Shoa are held with great ceremony in the capital. Once during every twelve months, before the commencement of a splendid feast, their souls are fully absolved from all sin, and the munificence of their illustrious descendant is still further displayed in the long line of beeves, which afterwards winds its way to the threshold of every church in Ankober.

The Talmud asserts, that those who die piously, remain in a state of active knowledge of all the occurrences of this world. Philo, the learned Jew of Alexandria, informs us, that the souls of the Patriarchs pray incessantly for the Jewish nation, and the erudite Rabbins believed

that angels are the governors of all sublunary things, and that a man in every country has a guardian angel for protection and direction. The Abyssinians carry this belief even further. They confidently anticipate the intercession of saints and angels in all spiritual and secular concerns. They invoke and adore them in even a higher degree than the Creator ; all their churches are dedicated to one in particular, and the holy ark is regarded as the visible representative of the respective patron. Without this *talot* the church is not Christian, and heretics alone doubt of its wonderful virtues and inherent power. Prayers and vows are offered to the box, and the kiss of adoration is held sufficient to bring down the desirable blessing. The ark of St. Michael accompanies all military expeditions to ensure success against the Galla, and that of Tekla Haimanot stands the palladium of the North, to preserve the empire from the attacks of the Mahomedan prince of Argobba.

Like the Pagans of ancient and modern times, who placed between the most High God and themselves a species of inferior deity, the Abyssinians observe this species of idolatry, although the names of their tutelar spirits have been changed. St. Michael and the Holy Virgin are here venerated as in no other country of the world ; the former as the martial leader of all the choirs of angels, the latter as chieftainess of all the saints, and queen of heaven and of earth. Both are considered as the great intercessors for mankind, and the prayer arises to their name, and the honor is ascribed to their memory, which belongeth only to the one Eternal.

The detrimental influence of this superstition is fully exemplified in the conduct of the nation. The mediator is ever employed when individual courage fails in impudent assurance or insatiable beggary. Time is uselessly wasted in importunity, which all believe must in the end prove successful, and the practice of invocation and intercession thus exerts the most baneful tendency even upon the daily dealing of life.

Like the Jews of old, the Abyssinians weep and lament on all occasions of death, and the shriek ascends to the sky, as if the soul could be again recalled from the world of spirits. The hired mourner of the Israelites raised the piteous wail. Here the friends and relatives of the departed assemble for the same purpose, and the absence of any from the scene is ascribed to want of love and affection. As with the Jews, the most inferior garments are employed as the weeds of woe, and the

skin, torn and scarified from the temples, proclaims the plunge into the last extremity of grief.

In later days, the extravagance of mourning has been somewhat moderated through the agency of a priest of the church of St. George, who stood boldly forward to arrest a practice equally at variance with the sacred books of the country, and with the spirit of the New Testament. Excommunication thundered her wrath upon all who should thenceforth indulge in the luxury of woe, and the people trembled under the ban of the Church. The death of a great governor soon confirmed the restriction. Loved and esteemed by all classes, the prohibition was severely felt. The complaint of lamentation was referred to the throne, and as the deceased was a man of rank and a royal favorite with all, the clergy were commanded to grant absolution in this one instance. But Zeddoo, the stout-hearted priest arose and declared, that he had no respect for persons, and the words of truth must be defended to the death. The silence of the monarch enforced the ecclesiastical fiat, and to this day the drum is mute at the funeral wake, and customary praise of the deceased is heard no more in the public resorts of the capital.

On the annual day of atonement, the Jews were obliged to confess their sins before a priest. In like manner, the Abyssinians are commanded from time to time to perform the ceremony during the great fast of *Hodada* more particularly, and on Good Friday, the day of the Jewish expiation; and as the slave in token of his freedom and dismissal received the blow from the Roman proctor, so the penitent on absolution, receives the stroke over the shoulders from the branch of the *woira* tree, as a sign of his deliverance from sin and Satan.

Murder and sacrilege ought to be immediately revealed to the officiating priest, and a particular confession of all crimes is enjoined once before death. The father-confessor is bound to the strictest secrecy, and it is believed, that on this point a dreadful oath is taken before ordination, when the mysteries of religion are explained by the *Abuna*, and especially those which have reference to the preparation of bread for the Holy Supper. In a small house styled Bethlehem, which rises immediately behind every church, the mysterious ceremony is performed. The deacon can alone bake the cake, and the most vigilant guard is invariably preserved against the approach or intrusion of females, or other improper visitors during the hours of solemn preparation.

The Jewish temple consisted of three distinct divisions ; the fore Court, the Holy, and the Holy of Holies. To the first, laymen were admitted, to the second only the priest, and to the third the High-priest alone. All entrance was denied to the Pagan, a custom which is still enforced in Abyssinia, and her churches are in a like manner divided into three parts.

“ Keunic Maalt” is the first enclosure to which all laymen have access, and wherein the priests and *defteras* perform Divine service by singing, dancing, and drumming. “ Mukdas” is the second, a corner of which is set apart for laymen during the administration of the Holy Supper, whilst a cloth screens the mysteries of the interior. Here also hang arranged around the walls, the bones of many deceased worthies which have been carefully gathered from the newly opened sepulchre, and are deposited by the hand of the priest in cotton bags. By the nearest relative the first opportunity is embraced of transporting these mouldering emblems of mortality to the sacred resting place of Debra Lebanos, where the living and the dead are alike blessed with a rich treasure of righteousness, since the remains of Tekla Haiman, the patron saint of Abyssinia, still throw over the scene of his miracles upon earth, a bright halo of holiness.

“ To Kuddist,” the Holy of Holies, none but priests are admitted. Behind its veil, the Sacrament is consecrated, and the tremendous mysteries of the ark are shrouded from the eyes of the uninitiated. Prayers, vows, and offerings are daily made to this idol sitting in the centre of the Abyssinian church, and the handiwork of some vain ecclesiastic is held up to the admiring multitude as the true ark of holiness, which secreted in a cave during the inroad of the conquering Graigne, has been discovered by a miraculous dream from heaven. Even unto this day the spoils of the temple of Jerusalem are supposed to remain a blessing to the land, and old and young, rich and poor, bow the knees as to the Omnipotent Creator, before a round wooden box which contains nought save the name of the patron saint of the Church.

But among the ignorant mass, the mystery is carefully preserved. The priest who dared open the lip to his countrymen regarding the contents of the casket, would suffer the heavy penalties due to sacrilege ; and although the gold of the foreigner has penetrated the secret of its interior, the dense fog of superstition will long obscure the

disgraceful idolatry from the confined understanding of the bigotted son of Shoa.

Like the Jews, the Abyssinians, although objecting to sculpture, ornament their churches with paintings, and kiss and pay the miserable daub every religious respect. The vow is offered as of old to the temple of Jerusalem, and oil and frankincense, shields and spears, cloths and money, are offered according to the worldly substance of the pious and superstitious donor.

The sweet singer of Israel danced and jumped before the Lord, and a vile caricature imitation remains the chief point of Abyssinian worship. Capering and beating the ground with their feet, whilst stretching their crutches towards each other with frantic gesticulations, the performers rather resemble lunatics than holy priests, and the clash of the timbrel, the sound of the drum, and the howling of harsh voices, complete a most strange form of devotion.

Like the Jews, the Abyssinians invariably commence the service with the Trisagion, and the morning lesson is performed with the same careless and irreverent demeanor for which the Hebrews were latterly blamed. The lessons are taken partly from the Scriptures, and partly from the miracles of the Holy Virgin, and of Tekla Haimanot, the life of St. George, and other foolish and fabulous works; but all are in the ancient Ethiopian language, which to the congregation is a dead letter; and the sole edification of a visit to the church is comprised in the kiss that is imprinted on the portal.

Pride, hypocrisy, and contempt of other nations are strangely at variance with the absurd imitations of customs and manners, which the Abyssinians have adopted from all. The Jews also hated the Heathen bitterly, styling them "dogs," and rejected of God: whilst notwithstanding their contempt and pride of holiness, they willingly received many of their superstitious practices. The Abyssinian will not eat with the Galla or the Mahomedan, lest he should thereby participate in the delusion of his creed; and the church and the church-yard are equally closed against all who commit this deadly sin. But the order of separation was applicable so long only as the knowledge of the one true God was restricted to a single nation; and the prominent principle of Christianity, that the light of the true faith should shine before all men, and be no longer concealed under a bushel, is here neither understood nor regarded.

The Abyssinians have also fully adopted the same spirit of merciless destruction, which impelled the Israelites to destroy their enemies from the face of the earth; considering themselves the lineal descendants of those heroes of ancient history, who were arrayed against the enemies of the Lord, they are actuated by the same motives and feelings which led the hand of Judah to the massacre. The foe is a Pagan who does not fast, nor kiss the church, nor wear a watch. All feelings of humanity are thrown to the winds, and a high reward in Heaven awaits the king and the blood-thirsty soldier for the burning of the hamlet, the capture of the property, and the murder of the accursed Heathen; self-interest rarely interferes in the tragedy of blood, and the captive is seldom secure even for the sake of the forthcoming ransom, or to pass the residue of miserable existence, a drudge in the household of the spoiler. The words of absolution from the mouth of the royal priest usher in the ruthless slaughter, and the name of the most high God is wantonly employed to consecrate the ensuing scenes of savage barbarity.

Abyssinia in her present state, belongs altogether to the ancient world. The pure principles of Christianity exist not in the land, and there remains not one solitary hope, that in her degraded condition she can tend, in any way to lift the curtain of moral darkness which hangs over the interior of the African continent; nor, redolent of evil principles and practice, is it to be desired, that she should be permitted to exert any important influence over the surrounding tribes.

The instruction gained from her teaching would prove small indeed, and the advance would be but trifling, from the state of heathenish superstition in which all are plunged alike.

The bigotry of ages is confirmed by the self-pride and the excessive ignorance of the present race; and on the rising, or on the unborn generation, rests the sole hope for the moral resurrection of the people.

But years must necessarily elapse before the folly and the falsehood of the nation can be successfully combated, ere the errors of her impure creed can be plucked out by the root, and the pure light of Christianity be introduced even by the most zealous and ardent messenger of the true Gospel.

(Signed)

D. C. GRAHAM, *Captain,*

Principal Assistant to the Embassy.

*The Abyssinian Church.*

Christianity is the national religion over the more elevated portions of Abyssinia, but the wild Galla has overrun her fairest provinces, and located himself in her most pleasant places. The bigotted Moslem crowds thick upon the skirts of her distracted empire, and the tenets she professes, are base, foolish, and degrading, engrafted on the superstitions of the Jew, the Mahomedan and the Pagan; promulgated by men, rude, ignorant and uninstructed, and received by a people emerging into the first stage of civilization. The light of religion must have been feeble even in the beginning, but as it was imparted, so it still remains. Sects and parties have arisen, and province has been banded against province in all the fiery wrath of the zealot; but lost in the maze of subtle controversy, these internal wars have raged for generations without disturbing the original doctrine, and the same errors of the Church prevail to this day throughout the land, as when first propounded in the beginning of the fourth century.

But the nation has not alone been called upon to sustain internal commotion, together with the fierce assaults of the heathen and of the fanatic followers of the false prophet. The measure of her oppression was not filled until the bitter cup had been drained, and deeply drained, of the converting zeal of European priesthood, until the usual horrors attendant upon religious war had been painfully undergone, and the requisite sacrifice of the life-stream of her children had been unsparingly poured out, when nearest and dearest relatives rallied under opposite standards, and when the same cry of destruction rung from either host—the glory of the true faith.

The glowing zeal of the Jesuit has seldom been displayed in more glaring colors, or in more decided defeat, than in the attempts so perseveringly made by that dread society to draw within the meshes of her encircling net, the remote church of Ethiopia. And although the means employed are to be justly condemned, still that ardour must be the theme of the high praise of all, which impelled old men and young to dare the difficulties and dangers of a rude uncivilized land, with exposure to the prejudices of a people, as bigotted as themselves in the cause of their religion.

But the wily system of establishing rival orders and monasteries, of mortification, of snapping asunder domestic ties, and of collecting toge-



ther bands of discontented enthusiasts, well served the interests of the Catholic faith; and there were always to be found servants obedient to bear instructions to the farthest corners of the earth; men who relinquished few comforts or enjoyments on quitting their austere cells, who were prepared at all hazards and in all manners to carry into execution the will of their superiors, and who gloried in the prospect either of erecting an eternal fabric in honor of their faith and their own peculiar order, or of obtaining the equally bright crown of martyrdom.

But the custom of ages had struck too deep into the heart of the Abyssinian.

The power of the officiating clergy was paramount in the land. All the passions and the prejudices of the multitude were too firmly enlisted in the cause of ancient belief; and degraded as was the Christianity of the country, its forms and tenets were not more absurd and not less pertinaciously supported, than those innovations of the Roman faith, which were so fiercely, though so ineffectually attempted.

The soft wily speech and the thunder of excommunication were alike disregarded. Treachery and force were both tried, and found equally unavailing. Blood flowed for a season like the swollen torrent, and the sound of wailing was heard from the palace to the peasant's hut; but the storm expended itself and finally passed away, and after the struggle of a century, the discomfited monks relinquished their attempts upon the church of the monophysite, without leaving behind one solitary convert to their faith, and bearing along with them the loud maledictions of the much-injured nation upon the head of the intruding and officious European.

Abyssinia has not, however, always displayed that firmness of purpose, and that stoutness of heart to do battle for her existing creed. Bowing her neck in olden time to the yoke of Judaism, she now in many localities basely truckles, as convenient opportunity offers, to the tenets of the Islam faith.

The date of her embracing a portion of the Jewish creed is lost in the obscurity of ages. Some of her sons, who love even the notoriety of doubtful fame, glorying in an origin from Menelek, the son of Solomon and the Queen of Sheba, relate the most ridiculous exploits of these their venerated ancestors, who crowned a long course of iniquity by plundering the temple of Jerusalem, and carrying off the spoil and the

holy books into Ethiopia; whilst others trace the legend of emigration to the period of the destruction of Jerusalem by the Romans. But whatever be the true date of their arrival, it is certain that the Hebrews have exercised a much greater influence upon the affairs of this country than in any other since the day of their dispersion; and although the taint of their religion was abjured by the nation on the Promethean touch of the true Gospel, the children of Israel, moulding a portion of their worship on the formula of the Christian faith, and esteemed as sorcerers and cunning artists in the land, found a safe asylum among the mountains, and exist to the present day here, as elsewhere, a separate and peculiar nation,

In the year 330, after the birth of our Saviour, Meropius, a merchant of Tyre, during a commercial voyage to India, landed on the coast of Ethiopia, where he was murdered by the barbarians, and his two sons, Fumentius and Edesius, both devout men, falling into the hands of the savage inhabitants, were made prisoners, and carried as slaves before the Emperor. The abilities, the information, and the peaceable demeanor of the brothers, soon gained not only their release, but high office in the court, and living in the full confidence of the monarch until his decease, and subsequently under the protection of the Queen mother, the good will of the entire nation quickly succeeded. The work of conversion was commenced, and proceeded with wonderful rapidity and success; a thriving branch was shortly added to the great Eastern Church.

Bearing the happy tidings, Frumentius appeared in Alexandria, and was received with open arms by the Patriarch Athanasius. Loaded with honors and consecrated the first Bishop of Ethiopia, a relation was thus happily commenced with Egypt, which has remained firm and friendly to the present day; and throughout fifteen centuries has bestowed upon a captive priest the high office of Patriarch Abuna of the Ethiopian church.

On his return to the country of his hopes, Frumentius found that the spark of life had spread rapidly throughout the gloomy darkness of the land. Baptism was instituted, Deacons and Presbyters appointed, churches erected, and a firm foundation laid, whereon to establish the Christian religion in Abyssinia. Frumentius was deservedly honored with a favored niche in the annals of her Church History, under the

title of Salama, which formed the subject of high praise to all the sacred poets of Ethiopia.

" Hail him with the voice of
Joy, sing praise to Salama,
The doors of pity and of mercy
And of pleasant grace ; Salute
Those blessed hands, bearing the
Pure torch of the Gospel.
For the splendour of Christ's Church
Has enlightened our darkness."

During the succeeding century, priests and apostles, men of wonderful sanctity, flocked into the empire from all parts of the East, and miracles the most stupendous are related in the legends of those days. Mountains were removed, and the storms of the angry ocean stilled by the mere application of the staff. The adder and the basilisk glided harmlessly under foot ; and rivers stayed their roaring torrent, that the sandal of the holy man should remain unstained by the flood. Aragainé raised the dead ; the fingers of Likands flamed like tapers of fire ; Samuel rode upon his lion, and thus the kingdom of Arwe, the old serpent of Ethiopia, was utterly overthrown, destroyed, and annihilated.

The Abyssinians now rose to the scale of subtle casuists and disputants. Abstruse doctrines were propounded, and speculative theories largely indulged in, and the sun of existence set upon the generation ere the knotty points had been satisfactorily determined of how long Adam remained in Paradise before his Fall ? And whether in his present state he hold dominion over the angels ?

In the year 481, the celebrated council of Chalcedon, lighted up the torch of misunderstanding regarding the two natures of Christ. The Eastern church split and separated in mortal feud, and the Saracen pounced upon Egypt, rent and wasted by discord and distraction. The Abyssinians denouncing the Council as a meeting of fools, concurred in the opinion of the Alexandrian Patriarch.

The faith of the Monophysite was declared to be the one only true and orthodox, and the banished Dioscorus received all the honors of a martyr.

" The Kings of the earth divided the unity of God and man.
Sing praises to the martyr, who laughed their religion to scorn.
He was treated with indignity, they plucked out his flowing beard ;
Yea, and tore the teeth from his venerable face. But in heaven a halo of honor
shall encircle Dioscorus."



The successor of St. Mark, however, could barely retain his own existence in Egypt during the succeeding oppressions and exactions of the Moslem; and Ethiopia, his remote charge, now nearly isolated from the remainder of the world, remained for the next ten centuries a sealed book to European history, preserving her independence from all foreign yoke, and guarding in safety the flame of that faith which she had inherited from her fathers.

The reign of the Ascetics succeeded to that of disputation, and men lacerated their bodies, and lived in holes and caves of the earth like wild beasts. Tekla Haimanot and Eustathios were the great founders of monkery in the land. An angel announced the birth of one, and the other floated over the sea, borne in safety amidst the folds of his leathern garment. Miracles still continued to be occasionally performed. Sanctity was further enhanced by mortification of the flesh, and austerity of life was highly praised and followed by the admiring mob.

The original discipline of the anchorite was severe in the extreme. It was to be continually girt round the loins with heavy chains, and to remain for days immersed in the cold mountain stream, to recline upon the bare earth, and to subsist alone upon a scanty vegetable diet.

Monasteries were at length founded, and fields and revenues set apart for the convenience of their inmates; and although a visiting superior was appointed to check corruption and punish innovation or transgression, the asperities of the monastic life gradually softened down. The *cheggue* preferred the comforts of a settled abode to wearisome tours and visitations; further immunities were granted to all loving a life of ease and spiritual license, and the commonwealth deplored the loss of a great portion of her subjects, who assisted her neither in taxes, nor in military service.

Ethiopia meanwhile extended her wide empire on every side, and her religion was imposed upon the conquered territories. From the great river Gochoh to the frontiers of Nubia, the crutch and the cross pervaded the land. Churches were erected on every convenient spot, and the blue badge of nominal Christianity encircled the necks of an ignorant multitude. The usual wars and rebellion arose, and schisms and sects fill up the archives of ten centuries, with all the uninteresting precision of more civilized countries. But still the Church flourished; the Patriarch was regularly received from Alexandria, a long list of ninety-five

Abunas flows quietly through the dull pages of Abyssinian record, from the time of Frumentius the First until the days of the venerable Simeon, who whilst gallantly defending the faith of his fathers, was barbarously murdered by the European partizans of the Italian Jesuit. It was not until the commencement of the sixteenth century, that any further mention was made of the Abyssinian Church, which during the darkness of the middle ages had fallen into complete oblivion; but rumours about that period were whispered abroad of a Christian monarch and a Christian nation established in the centre of Africa, and the happy news was first brought to the court of Portugal, that a Christian Church still existed, which had for ages successfully resisted, among the lofty mountains of Abyssinia, the fierce attacks of the sanguinary Saracen.

In the year 1499, Pedro Cavilham succeeded in reaching Shoa, where he was received with that favor which novelty usually secures; and although the stranger was prevented by the ancient laws of the kingdom from leaving the land, the quest had been successfully performed; the first link re-established of a chain, which had been broken for ages, and shortly afterwards the glories of Prester John and his Christian court were fully disclosed to abate the intense anxiety that reigned in the heart of every inhabitant of the West.

In due time, an Abyssinian ambassador made his appearance in Portugal; unbounded delight was experienced by king Emanuel and his court, and every honor was lavished upon Matthew, the merchant of Shoa. All believed that the Abyssinians were devout Catholics, and that a vast empire, estimated at four times its actual extent, was about to fall under the dominion of the Roman Church. A mission on a great scale was fitted out, the journey was safely accomplished, and excited fancy rioted for a time in the description of palaces and fountains which never existed, and pomp, riches, and regal power utterly unknown in the land.

Missions continued from either court during the succeeding forty years. An alliance was formed. Men learned in the arts and sciences were despatched to settle in Abyssinia. Zaga Zaba arrived in Lisbon, invested with full powers to satisfy the interests of both countries, temporal as well as spiritual. But the difference of faith was now for the first time understood. The bitter enmity of the Roman creed stood prominently to view, and the envoy, after studying the details of the

Catholic doctrine, and refusing to subscribe a similar contract on behalf of his Church, was unscrupulously put to a violent death in a Portuguese prison.

The first flattering ideas regarding the religion of the country being thus found erroneous, the delusion respecting the extent and power of the mighty empire was next to fall to the ground. The Galla were now streaming in hordes from the interior, and Graigne, the Mahomedan invader, carrying fire and sword with his army throughout the country. The dying Coptish Patriarch of Abyssinia was prevailed upon to nominate as his successor John Bermudez, a resident Portuguese, and the Romish priest, hurried by the king, proceeded to seek immediate military assistance from the courts of Rome and Lisbon.

Schemes of ambition flitted over the minds of the first conquerors of India, and an alliance with Ethiopia seemed highly desirable, as a handle for further acquisition in the East. But dilatory measures delayed the arrival of the Portuguese fleet until the suing monarch had been gathered to his fathers, and Christopher, the son of the famous Vasco de Gama anchored in the harbour of Massowah, at a time when the new emperor Claudius was sorely pressed to sustain himself upon the throne of his ancestors. The opportunity was not neglected by the Archbishop to reduce the heretic church to the fold of the Roman see; and a series of attempts were commenced, equally to be deplored, from the mischief which they created, and the unworthy means that were employed during the struggle.

The signal service rendered by the Portuguese troops during the ensuing wars, the total route of the Galla and Moslem, with the slaughter of their invading leader in the battle, placed Bermudez in a position to demand high terms from the re-instated monarch. The conversion of the emperor to the Roman Catholic faith, and the possession of one-third of the kingdom were imperiously proposed, and scornfully rejected. Excommunication was threatened by the proud prelate of the West, and utterly disregarded by king Claudius, who retorted, that the Pope himself was a heretic. Open hostilities broke out, and although the superior discipline of the Europeans for a time gave them the advantage, they were at length separated by a wily stratagem, and hurried to different quarters of the kingdom, and Bermudez being then seized, was conveyed in honorable exile to the rugged mountains of Efat.

Although much blood and considerable treasure had been thus fruitlessly expended, the conversion of Ethiopia was far from being forgotten in Europe, and the spark of hope was further kept alive by an Abyssinian priest, who asserted on his arrival in Rome, that the failure of Bermudez had entirely arisen from his own absurd and brutal conduct, and that the utmost deference would be paid to men of sense and capacity. Ignatius Loyola volunteered to repair in person to re-unite Ethiopia and the Roman Catholic church, but his talents being required for more important objects, the Pope refused the desired permission to the great founder of the Society of Jesus, and thirteen Missionaries from the new order were chosen instead. Nunez Baretto was elevated to the dignity of Patriarch, and Andre Oviedo appointed provisional successor.

At that period, the navigation of the Red Sea was rendered dangerous by numerous Saracen fleets, and the Patriarch deeming it inexpedient to hazard his own valuable person in the perils of the voyage, reposed quietly at Goa; whilst a deputation, headed by Gonsalvez Rodrigues, a priest of the secondary rank, was despatched in advance to ascertain the capabilities of the route, and the sentiments of the reigning monarch.

The Emperor Claudius little relished the arrival of these monks, and Rodrigues entirely failed in every attempt at conviction on the points at issue—that the Pope, as representative of Christ upon earth, was the true head of all Christians, and that there was no salvation whatever out of the pale of the Catholic Church; he was dismissed with the reply, that the people of Ethiopia would not lightly abandon the faith of their forefathers. The monk retired to work upon the mind of the monarch by the brilliancy of his controversial writing, but a lengthy treatise on the true faith produced no happy result, and the envoy, disgusted with his reception, returned shortly afterwards to Goa.

The spiritual conclave was plunged into consternation by the unhappy intelligence, and after much mature deliberation it was resolved, that the dignity of the Patriarch and of the great king of Portugal could not be exposed to the consequences attending the ill favor of the Emperor of Abyssinia, that therefore the prelate should still remain the guest of the Bishop of Nicaca; whilst the daring and restless Oviedo, with a small train of attendants, attempted the conquest.

Arriving in safety, the Jesuit experienced a most friendly reception from the Emperor Claudius, and although the letters of recommendation

from the Pope were received with mistrust and impatience, the habitual mildness of the monarch restrained him from any overt act of oppression. Deceived by this calm behaviour during a second audience, the Bishop was sufficiently fool-hardy to represent, in the most insolent language, the enormous errors under which the Emperor laboured, and to demand imperatively, whether or not he intended to submit himself to the authority of the successor of St. Peter, and thus remove the heavy obligation under which his empire already groaned? King Claudius replied, that he was well inclined towards the Portuguese nation; that he would grant them lands and settlements in his country; that permission would not be withheld to the private exercise of the religion of the West; but that as the Abyssinian Church had been for ages united to the charge of the Patriarch of Alexandria, a subject of such serious alteration must be canvassed before a full assembly of divines.

Indignant at what he termed Ethiopian perfidy, but still buoyed up with the faint hope of realizing his object, Oviedo changed his mode of attack, and addressed a laboured remonstrance to the monarch, written in the hypocritical tone of false friendship; earnestly entreating him to recall to his remembrance the assistance rendered by Europeans to his afflicted country, and the many promises made by his sire in the day of his urgent distress, imploring him at the same time to preserve a stern vigilance upon the evil influence of the empress, and of the ministers of state; for in matters of faith, the love of kindred must give away to the love of Christ, and in similar situations, the nearest relation often proves the bitterest enemy to the salvation of the soul.

This insidious reasoning was, however, vainly expended upon the intelligent Claudius, and served but to turn his heart further from the Roman and his cause. The offer of a public controversy on points of disputed faith being shortly afterwards accepted, the emperor entered the lists in presence of the assembled court, and utterly defeated the subtleties of the Italian priest by his clear knowledge of the Holy Scriptures; and thus, notwithstanding the conviction of the Portuguese Missionary, that by supernatural aid he had triumphantly refuted all the arguments urged by his illustrious antagonist, it was fully decreed by the Abyssinian conference, that neither king nor people, owed obligation or obedience whatsoever to the Church of Rome.

Still Oviedo was by no means reduced to silence. Treatise after treatise was published on the controversy, to confound the minds of the Ethiopians. The errors of the Alexandrian faith were fiercely attacked in every form and fashion, and the superior beauties of the Catholic religion fully expounded. But no advantage resulted, rejoinders and confutations followed fast from the insulted clergy, and the Bishop furious at the thoughts of his futile exertions to gain a footing in the country, entertaining no hope of making one single convert, whether among prince or people; resolved upon a last effort in the struggle, and on the fifth of February 1559, he issued his spiritual ban over the land, proclaiming that the entire nation of Abyssinia, high and low, learned and ignorant, having refused to obey the Church of Rome, practising the unholy rite of circumcision, objecting to eat the flesh of the hog and the hare, and indulging in many other flagrant enormities, were delivered over to the judgment of the spiritual courts, to be punished in persons and goods, in public and in private, by every means the faithful could devise.

The folly of issuing this curious rescript without any means of enforcement was fully appreciated, and the tyrannical conduct of the Bishop only served to strengthen the emperor in the bands of his own faith; finding, as was observed by an historian of the times, that Popery and its wiles were the more dangerous and reprehensible, as the veil was withdrawn from the spirit of her tenets.

There is every reason to believe, that the succeeding invasion of the Adaiel was procured through the treacherous designs of the Jesuits, but the event again proved disastrous to their cause. Although the revenge of the baffled Bishop was allayed in a torrent of blood, yet the death of the mild, moderate and liberal Claudius, who perished in the field of battle, shed a baneful influence on the ensuing efforts, and the sceptre devolved into the hands of his brother Adam, a haughty and vindictive prince, who is depicted in Portuguese records as cruel and hard of heart, and utterly insensible to the beautiful mysteries of the Catholic faith.

Swearing vengeance against the Latins, to whose treason he attributed the murder of his brother and the ruin of his country, the new monarch seized all the estates which had been granted to the Portuguese for rendered service; threatened the Bishop and his colleagues with instant death if they presumed to propagate the errors of the Romish



Church, and on a humble remonstrance being attempted, in the violence of his wrath he rushed upon the Missionary with drawn sword, vowing to immolate him on the spot. The weapon, however, say the holy fathers, dropped miraculously from his impious hand, and for a season the last extremity of vengeance was exchanged for a system of vile durance.

Portuguese troops in the mean time arrived from Goa, and the Bharnegash, the lord of the sea coast, bought over by the gold of India, and stirred up by the wily emissaries of the viceroy, assembled his forces in rebellion, and marching with his European allies to the capital, defeated and slew the emperor in a pitched battle, and rescued the Jesuit missionaries from their unpleasant captivity.

Warned by former difficulty and distress, the worthy fathers now assumed a more modest and humble demeanor, and were allowed to settle again in their old haunt of Maignagna, where they remained for a time unmolested by the new emperor, Malac Sarshed, who inherited all the horror of his father to the Catholic creed, although tempered by the mildness of his uncle Claudius. But the jealous monks had not yet relinquished their hope of advancement, and bending to the pressure of the times, the deep plot was veiled under the garb of passive obedience. The most pressing solicitations were dispatched to Goa for assistance, and the dauntless Oviedo pledged himself, with six hundred staunch Europeans, to convert not only the empire of Abyssinia, but all the adjacent countries.

The scheme, however, did not suit the politics of the day, and in 1560, the Bishop received an order from the head of his Society, to repair forthwith to his more promising charge in Japan; loath to abandon all his favorite projects of ambition in the country, and utterly reckless of truth, he addressed the most specious letters to the Pope, holding out a certain prospect of prostrating the Church of Ethiopia before the Apostolic throne; whilst to his immediate superior, he dilated upon the richness of the land and the mines of pure gold, which he falsely asserted to exist in every province of the kingdom. But his artful motives were thoroughly pierced by the more wily successor of St. Peter, and vessels soon after arrived on the coast of Africa, to convey the reluctant fathers to the Monastery of St. Xavier in Goa.

(Signed)

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History of the Abyssinian Church.—Continued.

Miserable indeed appeared the chance of conversion, and after a fierce struggle of thirty years, there remained not one priest of the Romish faith, to administer the Sacraments to the numerous European settlers and descendants in the country. Even the Jesuits themselves lost heart for the time; but the zeal of Philip the Second stirred the dying embers, and fresh candidates for strife, honor, and martyrdom, were soon in the field.

Peter Pero Paya and Antonio de Mantzerado, disguised as Armenian merchants, first attempted the perilous quest, but being wrecked on the Arabian coast, they were recognized as Christian ministers, and languished during seven years in a Moslem dungeon.

Goa next poured forth her priests to the ineffectual contest in seeking the promised land. Abraham de Georgis was discovered in Turkish garb on the island of Massowah, and the governor swore by the Holy Prophet, that since the Kafir had donned the attire of the true believer, he should also adopt the tenets of the true faith, or die the death of a dog. But the Jesuit clung to his creed and suffered accordingly, and shortly afterwards Jean Baptiste being detected in the assumed costume by the Turks of Commera, he also shared the same fate as his immediate predecessor in the thorny path of martyrdom.

Thus even the road itself seemed to close, and all intercourse was denied with a country, wherein the presence of Europeans was neither sought for nor desired; and which would have been suffered to remain unmolested, had not ideas been inflamed by the exaggerated accounts of its wealth, that still pervaded the imagination of all classes throughout the Western world.

Don Alexis de Menezes, the zealous Archbishop of Goa, who had already with fire and sword propagated Christianity in all Malabar, now entered the lists, and his sagacious and discerning mind selected the vicar of St. Anne as a fit tool for the execution of his project. Melchior Sylva, a converted Brahmin, might from his colour and language pass through the Turkish wicket; his zeal was great as that of his superior, and the valuable presents whereof he was made the bearer, might prove a bait sufficiently tempting to lure the simple Abyssinian into a fresh connexion.

The intelligence of his safe arrival, and of the gracious reception of the presents again roused the ardent spirit of the order of Jesus, and Peter Pays was quickly ransomed from the Arabs, and despatched with a full train of priests to Ethiopia, where he arrived in September of the year 1603.

Superior in every respect to his predecessors, this Missionary instead of attempting to carry his measures by force and overbearing insolence, sought the softer path of insinuation; and whilst his extensive knowledge and plausible address proved strong recommendations in his favor, many circumstances also conspired to forward his views. The country was in a most unsettled state, and the assistance of a few Portuguese troops could turn the scale of war. The condition of the Church was low and miserable. Eight years of incessant strife and distraction had crushed the very name of learning and literature. Few persons were to be found, who could read, write, or dispute. Ignorant and unworthy men filled every sacred office, and the ancient stout defenders of the Alexandrian faith, had been swept away on the battle field.

Amidst wars and rumours of wars, Peter quietly settled with his followers at Maignagna. Schools were opened, and the wonder ran through the land, that youths of tender age could refute the most learned sages of the wilderness of Walpayet. The curiosity of Za Denghel, the temporary occupant of the throne was excited, and Peter with his erudite pupils was summoned to the court.

Prompted by the hope of obtaining assistance from Portugal, this weak prince, under an oath of secrecy, immediately embraced the religion of his guest. But his time was fully occupied in the more worldly object of strengthening himself upon a throne, to which he had been elevated by his evil genius, and the falling away from the faith of his forefathers being at length whispered abroad, a rebellion broke over his devoted head.

The approaching storm having been perceived by the monk, he withdrew from court before the burst of a revolution, which for some time crushed his every hope of success. The emperor was slain, new aspirants strove for the ascendancy, and war reigned for a season throughout the entire land.

Confident in the near approach of the Portuguese troops which had been requested when Sylva carried to India the tidings of the first conversion;

Peter now resolved upon the bold game of espousing the weaker party, and thus gaining a firmer hold in the event of success. The expected reinforcements did not however arrive in time, and the defeat and death of his *protegé* was followed by the advancement of the pretender Sunscus to the throne of the empire.

Notwithstanding his appearance as a declared partizan in the opposing ranks, Peter's abilities as an architect now created a fresh diversion in his favor. The novel idea of a two-storied edifice engrossed the thoughts of the reigning king, and men flocked from the remotest parts of the country to gaze upon a fabric of stone, which was considered to be one of the wonders of the world.

A Missionary possessing the varied abilities and acquirements of Pays, could not be long in gaining ascendancy over a rude and illiterate monarch, and by address and perseverance, he had soon effected that which the threats and violence of his predecessors had vainly attempted during a long course of years.

Ras Cella Christoo, brother to the emperor, was the first fruit of the harvest. Partaking of the Holy Supper with the Latins, he publicly embraced their religion, and many chiefs and nobles followed his illustrious example. Crowded assemblies were held, in which the eloquence of the Jesuit entirely bore down the feeble efforts of the ignorant and uncultivated natives. The holiness of life, which was strictly preserved among the neophytes of the Catholics, added to the impression entertained of their wisdom, and the introduction of useful arts, raised the glory of the fathers still higher in the land, and the prospect of the aid of disciplined soldiers from the West overturned the last remaining scruple in the mind of the monarch.

An edict was published, interdicting all persons from holding office, who were not well inclined towards the Latin religion, and severe punishments were threatened for the promulgation of ancient doctrines. Assistance was solicited from Rome and Lisbon, and the work of European persecution favorably commenced by scourging with whips, all those stubborn monks who refused to forego their ancient belief.

Abba Simeon, the Abuna, repaired to the court to remonstrate with the emperor on the scandalous interference with his prerogatives in convening meetings and authorizing debates upon ecclesiastical matters; but his pride was timely soothed by the royal assurance, that all had been

undertaken for the benefit of true religion, and that the subject should be fully discussed in his own presence. Again the subtleties and dialectics of the Missionaries prevailed, and the total defeat of the Abuna and his clergy was followed by a second and more severe ordinance, awarding the penalty of death to all who should henceforth deny the two natures of Christ.

Wonderful was the sensation created by this severe edict, so diametrically at variance with the mild spirit of religion, and with all the ancient usages of the land. Aware of the feelings of the strong party at court, as well as of the entire body of the people, the Abuna placarded on the doors of the chapel an excommunication, to all who should accept the religion of the Franks, and the monarch irritated by this resistance, published a manifesto, that his subjects should forthwith embrace the Catholic faith.

This served as the signal trumpet for the fight. All classes armed themselves in defence of their religion, and Aclius, the king's son-in-law, placed himself at the head of the malcontents in Tigre.

Not yet thoroughly prepared for the struggle, the emperor found it convenient for a time to temporize, and requested one further debate, which was to prove final between the disputants. The mild Abuna listened to the proposal, and accompanied by a large train of monks appeared in the royal camp, whilst the Jesuit and his colleagues advanced into the arena from the opposite side. The controversy was renewed, and raged fiercely for six days; but disputes in religion cannot be adjusted by the reasoning of doctors, and the parties withdrew mutually incensed against each other.

One further effort was made to restore the disturbed harmony. The empress Hamilmala, and many of the courtiers, with tears implored the king to desist from his undertaking; and the Patriarch and the clergy throwing themselves prostrate on the earth, embraced his knees, and entreated him to turn a deaf ear to the poisonous insinuations of the deceitful Jesuits, and graciously to allow his subjects to remain faithful to the religion of their forefathers; but the heart of the monarch remained closed to the prayer. The Abuna quitted the court, plunged in the deepest distress, and a bloody war ensued, which shook the empire to its foundation.

When Aclius fully understood the last resolution taken by his father-in-law to defend the Catholics and their religion, he publicly appealed

to the people of Tigre, and proclaimed that all who were disposed to embrace the Jesuitical faith might repair to the deluded emperor; whilst those who held to the ancient belief, should forthwith gather under his standard; and finding himself shortly afterwards at the head of a large army, he marched towards the royal camp, resolved to establish the ancient doctrine of the land, or to perish in the attempt.

The Abuna Simeon, who had attained the venerable age of one hundred years, joined the army of the defenders of the Alexandrian faith, and in giving his Patriarchal blessing assured the soldiery, that all who should fall in the combat died the death of a martyr, and would receive their reward in heaven. The desired effect was produced, and the hearts of the entire force burned with one eager zeal to meet the accursed enemies of their religion.

On the appearance of the inflamed force, a reconciliation was attempted, and the daughter of the emperor was made the bearer of terms to her rebel lord. Her tears and entreaties were however totally disregarded. The impetuous youth prepared for instant attack, and the princess had barely time to regain her father's tent, when hostilities were commenced.

The soldiers of the viceroy rushed furiously upon the royal encampment, and Aclius succeeded in forcing his way, at the head of a small body of troops, to the very pavilion of his father-in-law. But he was here struck from his horse by a stone, and stumbled upon the ground. A panic seized the army of the fallen leader, and the rabble casting away their arms, fled in all directions.

The aged Abuna found himself alone and deserted in the same spot which he had occupied during the attack. His years and high clerical learning disarmed the violence of the Abyssinian soldiery, but a Portuguese partizan at length threw himself upon the Patriarch, and regardless of his white and venerable hairs, transfixed him with a spear. A frightful massacre ensued, and the heads of the principal leaders of the unsuccessful rebellion were exposed on the gates of the capital, as a bloody warning to the seditious.

Strengthened by this signal victory, other points of the Alexandrian creed were attacked in succession, and the time of the Jesuits was fully occupied in the translation into Ethiopic of sundry dogmatical treatises on subjects of disputed faith. But the barbarism of the language was



despised by most. The Latin interpolation was abhorred as magic by all, and a furious paper controversy raged for a time until the Abyssinians becoming scurrilous, the wrath of the monarch was again roused, and he issued a severe edict, wherein the people were forbidden from celebrating the Jewish sabbath, which from time immemorial had hitherto been kept sacred.

The inhabitants of Begemder flew to arms, and people from all parts of the country groaning under the yoke of foreign oppression, poured in to join the standard of rebellion, which Joanel had reared on the plains of his government. A horde of Galla delighting in the confusion, offered their assistance, and the most haughty conditions were speedily conveyed to court from a large assembly in arms.

Again the most earnest entreaties were employed to induce the emperor to compromise; but influenced by the words of the Jesuits, he called together his principal chieftains, monks, and learned men, and in their presence solemnly declared, that he would defend the Catholic religion to the last drop of his blood, adding, that it was the first duty of his subjects to obey their legitimate monarch.

Energetic measures were forthwith agreed upon, and at the head of a large army, the king proceeded in person to the war. Joanel finding himself too weak to contend in the plains, withdrew to the inaccessible mountains, where the blockade of the royal troops soon caused a scarcity of provisions. His forces gradually deserted, and he himself escaping to the Galla, was pursued, betrayed, and put to death.

This reverse sustained by the defenders of the old cause, did not however intimidate the inhabitants of Damat, a province situated on the banks of the Nile; for hardly had the emperor reached his capital, than the population rose *en masse*, with the determination of dethroning a monarch, who so basely truckled to foreign yoke, and of driving from the land the authors of its destruction. An army of fourteen thousand warriors was speedily organized, and monks and hermits, burning with zeal in the cause emerged from the cave and from the wilderness, to join the fast swelling ranks.

Ras Cella Christos marched against the rebels, but desertion considerably thinned his troops, and he confronted the enemy with barely one-half the numerical strength of their formidable army. Governor of the province, and greatly beloved by the people, a proposal was tendered to

him, that if he would only lend his assistance in burning the monkish books, and hanging the worthy fathers themselves upon tall trees, he might be seated upon the imperial throne of his ancestors. But the general despising the offer, and resting confidence in the firelocks of the Portuguese, rushed to the attack. The combat raged fiercely for a time. Four hundred monks devoting themselves to death, carried destruction through the royal host; but the tide of victory set at length in his favor, and after a fearful carnage on either side, he found himself master of the field.

Great rejoicings at court followed the news of this success. Peter declared that heaven, by the extermination of his enemies, had given the desired sign, that the Roman Catholic should be the religion of the land, and the emperor, who partly from fear of his subjects, and partly from dislike to relinquish his supernumerary wives and concubines, had not as yet publicly professed the Latin religion, now openly embraced the faith, and confessed his sins to the triumphant Jesuit.

A letter containing the royal sentiments was published for the benefit of the nation. "The king henceforth obeys the Pope of Rome, the successor of St. Peter, chief of the Apostles, who could neither err in doctrine nor in conduct, and all subjects are hereby advised to adopt the same creed." And the missionary who now reasonably imagined, that the work was satisfactorily concluded, wrote to the courts of Rome and Lisbon, requesting that a Patriarch and twenty ecclesiastics might be immediately sent to the vineyard, adding, that although the harvest was plentiful, the labourers were but few.

The happy tidings were received by Philip the Fourth of Spain; Mutio Vitelesse, the general of Jesuits offered to proceed in person, but the Pope refused permission, as had been the case with his predecessor Loyola, and Alphonse Mendez, a learned doctor of the Society of Jesus, was inaugurated at Lisbon with all the customary solemnities.

After suffering much difficulty and delay in his passage, the Portuguese Patriarch at length arrived on the Danakil coast, with a large train of priests, servants, masons, and musicians. The same greediness and cupidity were experienced amongst the savage Adaiel, that the traveller finds at the present day: baseness and avarice having stamped their character for generations; but the troubles of a weary march were soon forgotten in the cordial reception which awaited the party at the royal camp, and



the day was finally fixed when the homage of the king and of the country should be rendered to the Pope of Rome.

On the 11th of February 1626, the court and the nobles of the land were assembled in the open air. Two rich thrones were occupied by the monarch and his distinguished guest, and a surrounding multitude gazed upon the imposing ceremony in silence. The hour is come, exclaimed Mendez, when the king shall satisfy the debt of his ancestors, and submit himself and his people to the only true head of the Church. A copy of the Gospel was produced, and the monarch falling upon his knees, took the oath of homage. "We king of the kings of Ethiopia, believe and confess, that the Pope of Rome is the true successor of the Apostle St. Peter, and that he holds the same power, dignity and dominion over the whole Christian church. Therefore we promise, offer, and swear sincere obedience to the holy father, Urban, by God's grace, Pope and our Lord, and throw humbly at his feet our person and our kingdom."

As the emperor rose from his position, Ras Cella Christos suddenly drawing his sword, shouted aloud: "What is now done, is done for ever, and whoso in future disclaims the act, shall taste the sharp edge of his trusty weapon. I do homage only to true Catholic kings." The monks, clergy, and noblemen followed the example of their superiors, and the assembly was closed by a public edict proclaimed through the royal herald, that all Abyssinians should, under pain of death, forthwith embrace the Roman religion.

Palaces and revenues were set apart for the ministers of the new faith. Seminaries for youth were established throughout the country, and baptism and ordination progressed in peace. The success of the Jesuits increased rapidly, and many thousand souls were enrolled, who had been converted from the delusions of the Alexandrian creed.

The trial of two years failed, however, to convince the nation of the benefits of the new religion, and the Emperor and Patriarch could not deceive themselves in the fact, that the cause advanced rather in appearance than in reality. Missionaries who entered the native churches were found murdered in their beds, the most disparaging stories were everywhere circulated regarding the holy fathers, and more particularly on the representation of Scriptural performances at the Paschal feast.

when demons being introduced by Romans upon the stage, the spectators rushed simultaneously from the theatre exclaiming, "Alas they have brought with them devils from the infernal regions," and the tale spread like wildfire throughout the land.

Nothing daunted by the unfortunate fate of Aclius and Joanes, Tekla Georgis, another son-in-law of the emperor, with a large body of the discontented rose to defend the religion of their forefathers. Burning the crosses and rosaries together with a Jesuit priest, who fell into their hands, the party rapidly increased, and the emperor was compelled to march an army to quell the insurrection. The rebels were completely routed by Rebaxus, the viceroy of Tigre, and all who fell into his hands, men, women and children, were barbarously massacred. Georgis and his sister Adera concealed themselves in a cave during three days, but were at length discovered and brought before the irritated emperor, and condemned, by the advice of the Jesuits, to be burned to death as a heretic. Georgis was allowed by the monarch publicly to solicit the Patriarch to be admitted into the Roman church, but it being afterwards considered politic to imagine that his intentions were insincere, the unfortunate prince was hung in front of the palace in presence of the whole court; and his devoted sister fifteen days afterwards, suffered the same fate upon the same tree; notwithstanding that the most strenuous efforts were made to save her life by the queen, and by all classes of society.

To increase the dread effects of his tyranny, the emperor now issued a manifesto, that even as he had punished with death the obstinacy of his own son-in-law, so he would of a surety not spare any who in future committed a like transgression. The remarks of the worthy missionary Antoine regarding this execution, will shew the spirit which animated the fathers in their course of persecution, so novel in the annals of Abyssinia, and so contrary to the mildness of the Christian faith. He who reads with attention the history of Ethiopia will observe, that at no previous period was such ardent zeal displayed for the honor of religion, and a direct miracle indeed must have induced the emperor to hang his own son-in-law in the blessed cause.

Dazzled by the success that had hitherto attended their measures, the Patriarch and his colleagues now plunged headlong into proceedings which eventually proved disastrous to their cause. Excommunications

were lightly launched in civil disputes, and the souls of the royal councillors of the state were committed to the devil for daring to question the authority of the foreign priest. Conspiracies were hatched against the imperial person, and the body of a distinguished nonconformist ecclesiastic, which had been interred within the walls of the church, was exhumed by the orders of the Portuguese prélate, and thrown to the wild beasts; an action which raised the indignation of the Ethiopians to the highest pitch against a set of men, who had ever the words of religion in their mouth; but who, after persecuting the living, denied even to the dead that repose which neither Pagan nor Mahomedan ever disturbed.

The detestation of the fathers and their religion daily waxed stronger in the hearts of all. Their great patron, Ras Cella Christos, was deprived of power and property for seditious attempts, and the bold mountaineers of Begemedet at length seized their long spears to uphold the faith of their ancestors. The viceroy was driven from the province, and Malcaus, a youth of royal blood appointed defender of the ancient religion, and leader of the armed host of peasants, who flocked to his standard from all parts of the country; but especially from Lasta, the seat of the bravest warriors of the land.

To quell this insurrection, the emperor assembled in Godjam an army of twenty-five thousand men, and attacked the insurgents among their strong-holds. His troops were, however, repulsed at all points, with the loss of many officers and men, and he was reluctantly obliged to retreat to the plains. Deputies followed from the victorious camp, to supplicate him to take pity upon his subjects, and to dismiss those evil-minded strangers, who had so long oppressed Abyssinia. The royal army was in no heart or condition to renew hostilities; rumours went through the land that angels sent from heaven had proclaimed the restoration of the ancient religion, and in the general excitement the king perceived that his own authority would be fatally compromised, unless some concessions were made.

But the Patriarch was inflexible, and letters were at the same time received from Rome, instigating the emperor to combat stoutly with his rebellious subjects, and extending to Ethiopia the general absolution of the great year of Jubilee. The unhappy inhabitants laughed to scorn the offer of this indulgence, and were utterly unable to compre-

hend, by what authority the Pope held in his possession the keys of the kingdom of heaven.

Meanwhile the civil war continued with great expenditure of life, and alternate success on either side. Enticed on to the plain, the enemy were generally worsted by the royal troops; but among the recesses of their native rocks, the mountaineers had always the advantage. No sign of intended submission could be observed, and the monarch becoming suspicious of the Jesuits, who were erecting posts and strong-holds under the guise of churches and residences, lent a favourable ear to the entreaties of his subjects.

A second remonstrance was penned, wherein he forcibly set forth to the Portuguese Bishop, that the Roman religion had not been introduced into the country by the miracles or the preaching of the fathers; but by royal edict and ordinance, in opposition to the wish of the entire population, and that the prelate must devise some milder measure, for the furtherance of the true faith.

Foreseeing a heavy storm in abeyance in case of refusal, Mendez reluctantly complied with the proposal of a modified church code, under the restriction, that no public manifesto should announce the change, which must be gradually and silently introduced.

The ancient liturgy and the ancient holidays were thus restored, and the celebration of the Jewish sabbath once again permitted.

But the concession was insufficient, and came too late to pacify the turbulent mountaineers of Lasta, who had been altogether victorious during the war. They would listen to no modification of their first demand; but imperatively insisted upon the complete establishment of their ancient ecclesiastical institutions, together with the expulsion of the foreigners from the land.

The liberty and the customs of highlanders are seldom invaded with success, and a religion detested by the common people, cannot without much difficulty be introduced by the prince. Weary of so many rebellions, and murders, and excommunications, the king in his advanced age, began to view with an unfavorable eye the firebrand authors of these disturbances. Suspecting his brother and the Patriarch of suspicious views; offended by the contumacy of his subjects, and the increasing diminution of his own authority; disgusted with the present state of affairs, and apprehensive of future events; he now seriously

bethought himself of restoring the church to its original footing; but the rebellion must in the first instance be quelled, and having with this view concluded an alliance with the Galla, he marched towards Lasta.

Twenty thousand peasants, confident of victory, descending from their mountains, rushed upon the plain to meet the royal force. The two armies for a time remained in sight in that still calmness which precedes an earthquake. At length the Galla cavalry dashing at full speed on the crowded masses of the enemy, threw them into complete confusion, a fierce combat lasted until the going down of the sun, and the field of battle was left covered with eight thousand bodies of the insurgents.

Throwing themselves prostrate before the triumphant monarch on this scene of carnage, the vanquished peasants expressed their grief in the following lively terms: "Who are these men," they asked with groans, "whom you now behold bathed in blood. Are they Moslem, or Pagan, or even the enemies of the kingdom? No, they are Christians—they are all thy subjects, knit together by the most tender bands of blood, friendship and affection. Those warriors who now lie lifeless at thy feet, would under a better government have proved the bulwarks of the throne, and the terror of those very men by whose hands they have fallen. The Pagans even blush at thy cruelty, and call thee renegade for having abandoned the religion of thy fathers. Cease, O emperor, in mercy cease, to prolong a struggle, which must end in the downfall of the throne, and the ruin of all religion in the land." The empress also mingled her tears with the groans of the wounded petitioners, and adjured the king for the love of God, and in the name of future generations, to take pity upon his subjects, and desist from performing a sepulchre for himself and for his family. "What have you gained by this battle?" she exclaimed, "you have introduced into the kingdom hordes of Pagan Gallas, who detest yourself equally as your religion; but futile will be your attempt to establish in Ethiopia a form of worship which is unknown to the greater part of your people, and to the remainder is known only to be resisted to the last drop of their blood."

These representations sunk deep into the heart of the emperor, and instead of proceeding in triumph to the capital, he retired to a secluded spot to give vent to his feelings, and bewail the loss he had created.

The Galla troops were dismissed, and having collected all the principal monks and clergy, he announced his resolution of allowing the nation to return to the faith of their forefathers.

Immediately on this intelligence, the Patriarch hurried with all the Jesuit fathers to soothe the ruffled mood of the monarch! "I had fondly imagined," exclaimed Mendez, "that we were the victors, but behold we are the vanquished, and the rebels routed and put to flight, have obtained all that they desired. Call to mind how many fields thou hast won with the assistance of God and the Portuguese, and remember that thou didst embrace the true faith of thine own free will. We have been sent unto the charge by the Pope of Rome and by the king of Portugal, —beware of irritating great potentates to just indignation. They be indeed far off, but God is nigh at hand, and thy apostacy will defile thy name and that of thy nation, and leave an impenetrable stain upon the lion of the tribe of Judah which glitters in the standard of Ethiopia."

On the conclusion of this harangue all threw themselves at his feet, entreated an immediate order to execution, rather than a confirmation from his lips of the rash resolution he had taken.

Retaining a too lively recollection of the streams of blood that had been poured out upon the plains of Lasta, the emperor quietly allowed the Jesuits to arise, and unmoved by their earnest prayers and entreaties, replied shortly,—that his adherence to the Catholic faith had already caused the slaughter of a greater portion of his subjects, and that he would have no further dealings whatever with their doctrines.

The film fell from before the eyes of the discomfited monks. The friends of the Alexandrian faith rallying round the throne, united their utmost efforts to strengthen the emperor in his resolves, and the rumour spread abroad, that on the fast of St. John the Baptist, the ancient religion was to be re-established throughout the land.

Thousands assembled in the capital on that day to assist in the ceremony, and although temporarily disappointed, the clergy proved that this act of justice could no longer be safely delayed.

Every art and stratagem was still resorted to by the Patriarch to put off the evil day, but the emperor roused at length by the harsh and uncompromising character of the Jesuit, fiercely exclaimed: "Has then the sceptre departed from mine hand for ever?" and the royal trumpets

suddenly sounded through the streets of Gendar, as the herald announced the following proclamation to the empire.

"Listen and hear, we formerly recommended to you the adoption of the Roman Catholic creed, on the firm conviction, that it was the only true one; but numbers of our subjects having sacrificed their lives for the religion of their ancestors, and we henceforth accord its free exercise unto all. Let the priests resume possession of their churches, and worship the God of their forefathers. Farewell and rejoice."

It is not possible to describe the rapture with which this welcome edict was received. The praises of the emperor resounded from every quarter.

The rosaries and the chaplets of the Jesuits were tossed out of doors and burnt in a heap. Men and women danced for joy in the streets, and the song of liberation burst from the lips of the disenthralled multitude.

"The flock of Ethiopia has escaped from the hyenas of the West.
The doctrine of St. Mark is the column of our Church.
Let all rejoice, and sing Hallelujah;
For the sun of our deliverance has lighted up the land."

Sunscus did not long survive this victory over himself, for a slow fever carried him off during the month of September of the same year, and his son Basilides was called to the throne. His first act was the suppression of a conspiracy raised against him by the Jesuits, who were in consequence deprived of their arms and munitions of war, and exiled from Maignagna. The obstinate prelate long refused to submit to this order, until his effects having been plundered by the banditti, he also, after destroying the pictures and sacred utensils of the church, withdrew from the province for ever.

Still the fathers had not relinquished all hope of exciting disorder in Ethiopia, and finding their profit in the troubled waters. Entering into a treaty with the rebellious chieftain Johannes Akayus, upon condition of protection, they promised liberal supplies from India, both of money and Portuguese soldiers; but the emperor being soon made acquainted with the arrangement, expelled and commanded them to repair forthwith to Massowah.

The banished foreigners lay for some time concealed among the mountains, awaiting the expected succours from Goa; but the Patriarch

feeling insecure in his hiding place, escaped with great difficulty to the sea coast, where he was seized by the Turks, and for a season forced to work like a slave. Before taking leave of Akayus, his consent had been obtained to the sojourn of four Jesuits until assistance should arrive from the Portuguese possessions. Five years, however, elapsed without any accomplishment of their hopes, and they were finally delivered up to the Abyssinian monarch, who exiled them as traitors to the province of Lasta, where falling into the grasp of the infuriated populace, they were hung upon a tall tree to expiate their ambitious zeal.

After much persecution and insults at the hands of the Turks, and extreme suffering from the intolerable heat of the climate, the Patriarch was ransomed for the sum of four thousand dollars, and landed at Goa, where he sedulously employed himself in raising troops for the conquest of Abyssinia. Father Lobo was despatched to Europe in order to demand military assistance, which was never granted, and all the prelate's endeavours proving unsuccessful, he was at length reluctantly compelled to abandon the project in despair.

Thus terminated the labours of a mission, which for craft and cruelty has been seldom equalled in the annals of time. Whilst Rome must indeed have been prompted by no ordinary motion, to persevere so pertinaciously in a work of conversion through all the horrors of banishment and martyrdom, the unworthy means resorted to by the dauntless, but unsuccessful agents employed in the enterprize, have left an indelible stain upon the page of her history.

(Signed) D. GRAHAM, *Captain,*
Principal Assistant to the Embassy.

(True Copies.)

(Signed) J. P. WILLOUGHBY,
Secretary to the Government of Bombay.

Proceedings of the Asiatic Society.

(Wednesday Evening, 4th August, 1843.)

The usual Monthly Meeting was held at the Society's Rooms, on Wednesday evening at 8½ p. m. The Honorable the President in the chair.

The following new members were proposed:—

Major W. Anderson, B. H. A.—Proposed by H. Torrens, Esq., seconded by Capt. Broome, B. A.

Dr. Mouat, B. M. S.—Proposed by J. Thomason, Esq., seconded by H. Torrens, Esq.

Capt. Stephen, B. N. I.—Proposed by J. Thomason, Esq., seconded by Mr. H. Piddington.

M. Adolphe Delessert, author of "*Souvenirs d'un Voyage dans l'Inde*" was introduced to the Society, and upon the motion of Colonel Forbes, seconded by Mr. Torrens, was unanimously elected an Associate and Corresponding Member: the usual communication of the rules, &c. was ordered to be made to him.

The following list of Books presented and purchased was read:—

Books received for the Meeting of the Asiatic Society, for July, 1843.

Naturalist's Library—Ichthyology, vol. iv. British Fishes, vol. i. by R. Hamilton. Edinburgh, 1843.—Purchased.

The Oriental Christian Spectator, July 1843, vol. iv. No. 7. Bombay.—Presented by the Editor.
London Edinburgh and Dublin Philosophical Magazine and Journal of Science, 3d Series, vol. 22.
Nos. 143-144, February and March, 1843.

The Annals and Magazine of Natural History, London, vol. 11. No. 69, March 1843.

Chapitre inconnu du Coran, par M. G. de Tassy. Paris 1842, Pamphlet.—Presented by the Translator.

Julien, Simple exposé d'un fait honorable, odieusement dénaturé dans un libelle récent de M. Pauthier. Paris, 1842, Pamphlet presented by the Author.

Journal des Savants, for November and December 1842, and Janvier 1843. Paris purchased.

Meteorological Register for Calcutta, for the month of June 1843. Surveyor General's Office.

Mineral Resources of Southern India, by Lieut. (now Capt.) Newbold, F.R.S. &c.—Presented by the Author.

Penny Cyclopaedia, vol. 1 to 24.

The Secretary called the attention of the Meeting to the absolute necessity for the purchase of books of standard merit, for reference in the various departments of the natural sciences. He stated, that while the Society's splendid and increasing collections in Zoology, Osteology, Palaeontology, Geology, Mineralogy, and their various subordinate branches, were daily increasing, and likely to increase, the Curators, who were its paid and working officers in all these and other departments, were obliged to find the necessary works of reference as they best could, in their own libraries, or in those of others, and thus much valuable time was lost, and many sources of information were closed to them from the frequent impossibility of pro-

curing rare, or costly, or little known works, and from the want of those recent ones which afford the knowledge of the current and hourly changing state of science at home; and that without such works it was most unfair, as well as impossible, to expect that the duties of the Curators and the Editorship of the Society's Journal could be conducted in a manner fully creditable to the high reputation of the Society. He had therefore presented this evening the following works for the inspection of the Society, and for purchase, if these views were approved of:—

Cuvier, *Histoire Naturelle de Mammifères*. Paris, 1824, 3 vols.

Selby's *British Ornithology*, 2 vols.

And he proposed farther, that upon lists being prepared by the Curators, the purchase of such standard works as they may require be authorised.

Some members expressed a wish, that some of the literary departments of the Society's Library should also be better furnished, particularly those relative to Oriental matters. After some conversation, the purchase of the Penny Cyclopaedia was authorised. Cuvier's *Mammifères* was to remain till the decision of the Committee of Papers was known, and Selby's *British Ornithology* being considered as nearly superseded by later and better works of reference, was returned to the booksellers. It was farther agreed, that a memorandum should be circulated to the Committee of Papers on this subject.

Read the following letter from the Secretary to the Government of Bombay:—

No. 1460 of 1843.

From the Chief Secretary to the Government of Bombay, to H. TORRENS, Esq., Secretary to the Calcutta Branch of the Royal Asiatic Society.

Political Department.

SIR,—I am directed by the Hon'ble the Governor in Council, to acknowledge the receipt of your letter, dated the 9th ultimo, and to inform you, that the 24 copies of the Vocabulary, by Captain Eastwick, of the Scindee Language therewith forwarded, have been received by me.

I have the honor to be, Sir,

Your most obedient Servant,

L. R. REID,

Chief Secretary to Government.

Bombay Castle, 26th June, 1843.

No. 1625 of 1843.

From the Chief Secretary to the Government of Bombay, to H. PIDDINGTON, Esq., Sub-Secretary Asiatic Society at Calcutta.

Political Department.

SIR,—I am directed by the Hon'ble the Governor in Council, to acknowledge the receipt of your letter, dated the 10th of May last, and to acquaint you for the information of the Committee of the Asiatic Society, that the packets which accompanied it, have been forwarded to Major Leech and Captain Eastwick.

I have the honor to be, Sir,

Your most obedient Servant,

L. R. REID,

Chief Secretary.

Bombay Castle, 15th July, 1843.

Read the following letter from the Secretary :—

To F. J. HALLIDAY, Esq. Secretary to Government of Bengal, Asiatic Society's Rooms, the 21st June, 1843.

SIR,—With reference to Mr. Secretary Bushby's Letter, No. 446, dated the 31st March, 1841, I have the honor, by direction of the Hon'ble the President and Members of the Committee of Papers of the Asiatic Society, to submit a statement of Disbursements made by the Society on account of the Museum Economic Geology from February 1841 to May 1843 both the months inclusive amounting to Rupees 1,040 : 7 : 3, of which a considerable proportion is for postage and apparatus for the laboratory ; and to request that the permission of the Hon'ble the Deputy Governor of Bengal may be obtained for the Sub-Treasurer to pay the amount to my receipt.

2. I am also desired to request, that His Honor will accord the Society authority to draw from the General Treasury monthly a sum not exceeding Rupees 64, for Establishment and Contingencies

Establishment.

| | | |
|------------------|-----------|----|
| 1 Writer, ... | Co's. Rs. | 16 |
| 1 Carpenter, ... | " | 8 |
| 1 Peon, ... | " | 5 |

| | | |
|-------------------|---|----|
| | " | 29 |
| Contingencies, .. | | 35 |

| | | |
|-----------|-----|----|
| Co's. Rs. | ... | 64 |
|-----------|-----|----|

for the Museum Economic Geology, as exhibited in the margin, which after the experience of two years seems indispensably necessary for the efficient discharge of the duties of the Museum.

3. The utmost care will be taken in conducting the outlay on such a scale of strict economy as to be kept within the Estimate for Contingencies. Should a surplus exist at the close of the year, it will be duly carried to credit on account of the ensuing twelve months, and special report made accordingly.

I have, &c.

H. TORRENS,

Vice President and Secretary Asiatic Society.

And the reply thereto, as follows :—

No. 691.

From Under-Secretary to the Government of Bengal, to H. TORRENS, Esq., Vice President and Secretary Asiatic Society, dated Fort William, 3d July, 1843.

SIR,—I am directed by the Hon'ble the Deputy Governor of Bengal to acknowledge the receipt of your letter, dated the 21st ultimo, submitting a statement of Disbursements made by the Asiatic Society on account of the Museum Economic Geology, from February 1841 to May 1843, amounting to Rupees 1,040 : 7 : 3, and in reply to state, that the necessary instructions for payment of the same will be issued from the Financial Department to the Sub-Treasurer.

As regards the further request of the Society for authority to draw from the General Treasury a monthly sum of Rupees 64 for Establishment and Contingencies, for the Museum Economic Geology, I am desired to say, that a reference on the subject will be made to the Supreme Government.

I have the honor to be, Sir,

Your most obedient Servant,

A. TURNBULL,

Under-Secretary to the Government of Bengal.

Read the following letter from Professor J. Mohl of Paris :—

H. PIDDINGTON, Esq., Acting Secretary of the Asiatic Society of Bengal.

SIR,—I have received your letter of the 6th of March, by which you inform me, that the Asiatic Society of Bengal has done me the honor to elect me a Member of the Society. I am very gratified for the great distinction thus conferred upon me, and beg you will have the kindness to lay before the Council of the Society, the expression of my thanks for it.

I have the honour to be, Sir,

Your very obedient Servant,

JULIUS MOHL.

Paris, 20th of May, 1843.



And the following extract of a private letter from M. Mohl, addressed to Mr. Piddington, as Acting Secretary of the Society, in reference to the incomplete presentation of works in the Society's Library. (See Proceedings of July.)

MY DEAR SIR,—Allow me first to thank you for the part you have had the goodness to take in my election as Foreign Member of your Society; it is an honour which I appreciate very highly. I will try to answer on all the points on which you have written to our friend Troyer.

1st. The debt of the French Government to the Asiatic Society for copies of the Vedas must by this time be paid. It ought to have been done a long time ago.

2d. The books you want shall be bought and sent very shortly. I see that there is not money enough at the account of your Society, because the delay of the box containing the 4th vol. of the Mahabharat has stopt the sale of the book for a long time, and most people who have bought the 1st vol. have got impatient and sent to London for the last volume. But the books shall be bought notwithstanding.

3d. You have sent a list of books which have arrived incomplete; I will try to explain the matter as far as I can.

Agassiz, Hist. Nat. des Poissons 1er livraison. I do not think this was sent by our Society.

Cuvier Hist. des Poissons vol. i.—xvi. If a further vol. should have appeared, it shall be sent.

Quatremère Hist. des Mongols, vol. i. Is all that has appeared.

Mohl, Livre des Rois de Firdousi, vol. i. The second vol. has appeared and shall be sent.

Histoire Generale des Huns, vols. i. and ii. I am sure this was not sent by us.

Quatremère, Histoire des Sultans Mamelouks 1. et 2. Is all that has appeared, but a new vol. is coming out. It was not sent by us, but most likely by the Translating Fund in London, whose property it is.

Dubeux, Chronique de Tabari, vol. i. Is all that has appeared, the second vol. is printing; it is the Translating Fund's property.

Jacquemont, Voyage dans l'Inde, 13 livrs. There have appeared 45 livrs. till now. It was most likely sent by the French Minister of Public Instruction, and I will enquire why the rest has not yet been sent, and try to get it.

Vendidad Sadi, by Burnouf, nine numbers were sent by us; it is all that appeared, but the last number is printing, and shall be sent.

L'Espagne Artistique, 1 livr. was not sent by us.

Harivansa by Langlois, must have been sent by the Translating Fund, whose property it is.

Description de l'Egypte. I have no idea who has sent this. I asked about six years ago M. Thiers, then Minister of the Interior, to present a copy of it to your Society; it is possible he sent it through the Marine. I will try to get it completed, but am not sure to be able to do it. I know it is a most complicated business to get a copy of this work.

4th. I am afraid a large box of books sent by us must have been lost somewhere. Mr. Prinsep offered us to take charge of a number of copies of the Asiatic Society's books, to be sold in Calcutta, we sent in 1838, a few copies of each; amongst the rest, 12 copies of Mr. Troyer's *Raja Tarangini*, but we never heard of them again, and I do not find in your lists of books received any mention of them. Mr. Prinsep had advised me to address the books to the Governor General, as they would be then free of duty, and as the Governor General in the interval went to Upper India, it is possible the books may have followed him, and be left or lost somewhere. It is most likely quite useless to enquire now for them; but if you should believe that any of them would find buyers, I would be very happy to send another set. You will find the list on the cover of any number of our Journal.

Read, and approved, the following drafts of letters to Ministers of Foreign Courts, and to the Vice-Chancellors of Universities, to be sent with the presentations of the Society's Oriental works, as per resolution of the last Meeting, (See Proceedings of July,) and it was farther resolved, that communications should be opened with literary and scientific societies in Europe and America as occasion might offer.

To His Excellency the Minister of Public Instruction of France.

I have the honour, by direction of the President and Members of the Asiatic Society of Bengal, to forward to you two complete sets of each of the works noted in the margin, being standard works in (and upon) the Arabic, Sanscrit and Thibetan languages, published or deposited for sale with the Society.

The Society requests that you will place these books at the disposal of His Majesty the King of the French, with the expression of their respectful hope, that they may prove of sufficient interest to merit a place in the Royal Library, or in one of the Public Libraries of His Majesty's kingdom.

Should any works published, (as so many have munificently been by the French Government,) for the general benefit of science, be now in course of distribution to learned bodies, Colleges, and Societies in Europe, the Asiatic Society of Bengal would beg to inscribe its name as that of a constituted body labouring in the cause of general science, and earnestly desirous of reciprocating the presentation of works, the tendency of which is its advancement.

France, 2—Holland, 1—Prussia, 1—Austria, 1—Russia, 1—America, 1—Universities of Oxford, Cambridge Dublin, and Christiana.

To the Very Reverend the Vice Chancellor of the University of Oxford.

REV. SIR,—I have the honour, by direction of the Asiatic Society of Bengal, to forward to you for presentation to the University over which you preside, the books noted in the margin, being standard works in (and upon) the Arabic, Sanscrit, and Thibetan languages, published by or deposited for sale with the Society.

The Society begs that should any works published for distribution to learned bodies by the University, or under its patronage, be now in course of such distribution, its name may be inscribed as desirous of reciprocating the presentation of works, the tendency of which may be the advancement of science and literature.



No. II. of Mr. Heatly's Paper on the Mineral Resources of India, and a Memoir of Mr. Keir, one of the early speculators in various Indian products, were presented for the Journal, to the Editors of which they were referred.

Extract of a letter from Mr. Batten, C. S. dated Almorah, 17th July, was read, stating that Capt. Boyes, 6th L. C. (See Proceedings of June p. 521) had unfortunately only reached Milum in his progress towards the Passes, having there lost almost all his baggage by a sudden flood.

The following letter, accompanying a note on a Fossil Antelope, from the Dadoopoor Museum, by Capt. Baker, B. E., was presented with a very beautiful drawing, shewing the close relation of the Fossil to the African Antelope types, *Acronotus Caama* (the Hartebeeste,) and *A. Lunata*, (the Sassaybe,) with its deviation from the Indian Antelopes. This curious relation excited much interest, and the paper and plate will appear in an early number of the Journal.

To the Secretary of the Asiatic Society.

DEAR SIR,—I have the pleasure to forward a paper for publication in the Journal of our Society, should you consider it suitable for that purpose. I am about sending the *élite* of my Fossils to Europe, and will, if I can find time, send you a brief notice of the most remarkable among them.

Believe me, dear Sir,

Yours sincerely,

W. E. BAKER.

Kurnaul, July 21, 1843.

Read the following letter from Captain D. Williams, first Assistant to the Commissioner, Arracan, accompanying two Gold Coins presented by him to the Society.

Ramree, Arracan, 5th July, 1843.

DEAR SIR,—I have now the pleasure to send you, for presentation to the Asiatic Society, two of the gold coins found on Cheduba Island, they are the most perfect of those found.

The Natives who found them tell me, they were dug up out of the sand on the Sea beach, about 100 yards from the Sea, scattered about.

I shall feel obliged if you will let me know what country, &c. these coins belonged to, as I can gather no information on the subject from the Mugs.

Yours truly,

D. WILLIAMS.

The coins have not yet been recognised, and we are inclined to consider them, if not Siamese or Burmese, of a very early Hindoo type, perhaps even as far back as the dynasties under which the Hindoos were a navigating and a colonising people. They are of thin sheet gold, rudely cut out, 1.4 and 1.3 inches in diameter, but weighing* only 76.5 and 77 grains, and stamped on one side only. The central emblem is an elephant surrounded by monograms or symbols. We shall take an early opportunity of lithographing these curious reliques.

Read a paper "On an improved Sympiesometer," called "The Tropical Tempest Sympiesometer," by Mr. H. Piddington. The instrument was also exhibited, and the paper referred to the Journal.

Read "Memorandum on Zoological Desiderata from Arabia," by E. Blyth, Esq. the Society's Curator, intended for transmission to Aden and other parts in that neighbourhood.

Read the following letter from Major W. Anderson, B. H. A. accompanying 19 bags of specimens therein alluded to:—

To the Vice President and Secretary to the Asiatic Society.

MY DEAR TORRENS,—I have the pleasure to send you the various bags of musters. On looking them over, I fear they are not so valuable as I had hoped, but as they are, I should like a good professional report, as to quality, use, and price here, which information from their own country I have in Persian, and will prepare.

1. Roodung.
2. Pistah.
3. Zureesh.
4. Hanab.
5. Hing.
6. Buz-Gung.
7. Zeeruh Sufuced.
8. Gul Kajuree.
9. Alooe Eerance.
10. Teerungabeen.
11. Zaj.
12. Keermuz.
13. Sualob Misree.
14. Sulphur from Bagh.
15. Gum used to fix or dry paint.
16. Safflower, I suspect.
17. Teerungbaeen.
18. Tooleæ.
19. Zumah Buloooree.

Your's sincerely,

WM. ANDERSON.

Ichapoor, 26th July, 1843.

A paper on "The Mineral Resources of Southern India," by Lieut. (now Capt.) Newbold, M. N. I. was presented by the author.

Read a letter from A. A. Sevestre, Esq. giving cover to his subscription of 50 rupees, towards the Portrait of the Hon'ble Mr. Prinsep.

Report of the Curator of Museum Economic Geology, &c.

Geological and Mineralogical Department.—We have to announce here the contribution of a very handsome little suite of Geological specimens from Almorah to Mullarie, sent by our new and zealous member, Capt. Boyes of the 6th Light Cavalry. These specimens are unfortunately small, but they are accompanied by a capital



Map of the localities, and an accurate catalogue of them, to which illness has prevented me from adding the Mineralogical designations.

Museum of Economic Geology.—I noted in my last Report that we have received a reference from Government on the subject of the Argentiferous Lead and Antimony Ore of Chota Nagpore, forwarded to Government by Colonel Ouseley; I now present, with the correspondence, my Report to Government through our Secretary.

No. 576.

From Under-Secretary to the Government of Bengal, to H. TORRENS, Esq., Secretary to the Asiatic Society, Calcutta, dated Fort William, 5th June, 1843.

SIR,—I am directed to forward to you, for the purpose of being submitted to your Society, the accompanying copy of a letter from the Agent to the Governor General S. W. Frontier to this Department, and certain Specimens of Argentiferous Galena alluded to in the letter. The Hon'ble the Deputy Governor of Bengal requests your Society will, in conjunction with Mr. Piddington, make such further enquiries and experiments as may be necessary, and report the result to this Department.

I have the honor to be, Sir,

Your most obedient Servant,

A. TURNBULL,

Under-Secretary to the Government of Bengal.

No. 24.

From Lieut. Col. J. R. OUSELEY, Agent to the Governor General S. W. Frontier, to T. R. DAVIDSON, Esq., Secretary to the Government of Bengal, Fort William, dated 22d May, 1843.

SIR,—Herewith I beg to forward specimen of Argentiferous Galena from a place N. N. West of this, named Hisato, for the inspection of the Hon'ble the Deputy Governor.

2d. From analysis here by Dr. Macrae, and the examination of it and tests applied by Mr. Piddington in Calcutta, reported in the Journal of the Asiatic Society, a very large proportion of silver is attainable. It may be considered desirable by the Government to make further inquiry, and if, as anticipated by Mr. Piddington, the results should prove so very profitable, adopt measures for working the mine, which is within the Zemindary of Ramgurh. The lead ore is abundant.

I have the honor to be, &c.

(Signed) J. R. OUSELEY,

Governor General's Agent.

Chota Nagpore, 22d May, 1843.

P.S.—Despatched this day.

1 Specimen of Ore.

1 Ditto ditto.

1 Small parcel with Matrix.

(True Copy.)

A. TURNBULL,

Under-Secretary to Government of Bengal.

H. TORRENS, Esq., *Secretary of the Asiatic Society.*

SIR,—In reply to the reference to the Museum of Economic Geology by the Hon'ble the Deputy Governor in Council, accompanying a specimen of the ore and matrix forwarded by Major Ouseley from Hisato, 12 miles N. N. W. of Chota Nagpore, under date of June, 1843, I have the honor to report as follows:—



1. My former Report (Journal, vol. xi. p. 892,) to which Major Ouseley's letter refers stated, not that "a very large proportion of silver was attainable," but simply that the proportion of silver then found "*would in Europe be thought worth working.*"

2. The present specimen is a less favourable one, giving a mere trace of silver, and this is a just instance of the uncertainty of these small laboratory trials of ores, especially as far as relates to the value of minute parts. No two experiments agree, and where the proportion of the valuable ore is a mere fraction, the results are of course always the more uncertain.

3. The appearance of the matrix, and the presence of the antimony are, as before remarked, favourable indications; *but they are nothing more*, and indeed my report might stop here, and be comprised in this, that the present specimen is an ore of little or no value in its present situation, and with present appearances, but offering indications worth farther investigation.

4. It may however be satisfactory to Government and to Major Ouseley to have the reasons upon which this view is founded, and I therefore take leave briefly to state them here, as it is specially within the province of our institution to explain matters of this nature.

5. In all mining, and indeed in many other countries, it has been well remarked, that it is not veins and ores that are wanting, but *profitable* ones. It was the ignorance or neglect of this great and first principle in mining speculations, which sacrificed so many millions of English capital in Mexico and South America. The agents of the Mining Companies could not, or would not, suppose that a *Silver mine*, or a mine which produced Silver ores could be a losing concern, and they bought up, at enormous prices, hundreds of spots from which indeed Silver was obtainable, but not to a profit.

6. In the case before us, we have, at the most, an ore of Lead and Antimony, with the minute portion or traces of Silver which always accompany these ores, and supposing it to be obtainable in any quantity, and at the cheapest possible price, or indeed for nothing, we should still require all the expensive resources of the best European Metallurgy, and establishments with scientific superintendence to render it a marketable article here. As a mere ore, it would probably not pay its carriage to Calcutta and freight to Europe.

7. In a spot then affording only favorable indications, and where we have assumed already much that is doubtful, it is clear that the first step is to know—

I. What the vein really is?

II. What are the facilities for, and difficulties against working it, and the expence attendant on all these and on the necessary superintendence?

III. What those for transporting the products to a market are?

I. The vein may be the outcrop of a rich mine, or it may be worthless or unworkable, or break off, even for Lead and Antimony, at 20 fathoms deep. It follows that a professional and a scientific man should first be sent to the spot with all necessary means, that a shaft or gallery should be dug, and the ores from it, as far as he can reach, be examined. This is necessarily and indispensably the first step.



II. During this examination, all questions relative to the facilities and difficulties likely to attend on the working would be inquired into, and in India these are far more than Europe, as the following enumeration of a few of them will shew: 1st, healthiness or unhealthiness of the site; 2d, possibility of obtaining workmen; 3d, of subsisting them; 4th, of erecting machinery, furnaces, and the like; 5th, fuel; 6th, drawing or pumping water; 7th, general cost of bringing the ore to bank (i. e. to the mouth of the mine; 8th, cost of preparing, smelting, and produce of the metal at the furnace.

III. Supposing the metal or ore to be thus obtained at a profitable rate, it has yet to be taken to a market, and this involves all the questions of road, carriages, warehousing and agency in Calcutta, and perhaps even freight, insurance, duties and sale charges in England.

From the foregoing then it will be seen, that we can recommend at the most but a careful examination of the vein as an indispensable preliminary step; but this I should respectfully beg to do, because the locality being about the lines where the granite and stratified formations meet is a favourable one; because the appearance of the ore is favourable; and because it is really a question of much interest in a district so little known, and so near to Calcutta, to determine what it may really prove to be. I may mention, finally, that the matrix of the present specimen differs greatly from the one formerly sent. There may evidently be half a dozen other valuable mineral substances at this spot or near it, though considered as mere stones by those unacquainted with them. One of the richest of the silver ores, for instance, the muriate of silver, (not unfrequently found in company with such as the one under examination,) would in all probability be thought a worthless stone.

I have the honor to be, Sir,

Your obedient Servant,

H. PIDDINGTON,

28th July, 1843.

Curator Museum of Economic Geology.

P. S. In illustration of the closing remark of this report, that valuable ores of Silver (as of many other minerals) may easily be passed over as worthless stones, I beg to quote from Professor Jameson's Mineralogy, vol. iii. p. 75.

"In some parts of Mexico, however, as we are informed by Mr. Humboldt, the operations of the miner are directed to a mixture of ochry brown Iron ore and minutely disseminated native Silver.* This ochreous mixture, which is named *Pacos* in Peru, is the object of considerable operations at the mines of Angangneo in the intendancy of Valladolid, as well as at Yxtapexi in the province of Oaxaca."†

I am fortunately enabled to exhibit to the Society from my own collection, about twenty specimens of silver ores of various kinds, but mostly such as shew little or no appearance of metal, and several are the true *Pacos* from Peru, the inspection of which will at once convince the most sceptical of this curious fact. Humboldt indeed adds, that a very large proportion of the silver of Mexico and South America

* Of muriate of silver also.—H. P.

† *Pacos*, according to Klaproth, contains Silver, 14 0

Brown Oxide of Iron, 71 0

Silica, sand, water, &c. 13 0



is obtained not from rich ores, but from the poor ones approaching to this remarkable mineral.

Memoranda by the Secretary and President.

I have the honor to lay before the Hon'ble the President, and the Members of the Committee of Papers, the report of the Curator of our Museum of Economic Geology upon Major Ouseley's specimen of an Ore from Chota Nagpore.

As the considerations contained in this report appear very sound and pertinent, I would submit whether the Society would not do well in addressing Government to call special attention to them.

How far such considerations might induce high authorities to propose attaching a practical master miner to the Department of Economic Geology confided to our Society, I of course cannot pretend to speculate upon; but it is evident, that unless local experiment be entered upon, the value of the ore in question as a profitable working ore can hardly be determined.

* As Mr. Piddington's reflections apply equally to all newly discovered Indian mining sites, the employment of a professional miner on those of which we already know the existence, can alone lead to practical results.

29th July, 1843.

H. TORRENS,

Vice President and Secretary.

A copy of Mr. Piddington's report should, I think, be forwarded to Government in reply to the reference made to us on the subject. W. W. B.

At the close of the Meeting, the Hon'ble the President and Members were invited to view the tablet placed over the Asoka Stone, which we may state is placed on a stand beneath the pillar destined for the bust of the lamented James Prinsep. The tablet is one of pure white marble occupying a frame above, the Stone; and the inscription upon it in letters of gold is as follows:—

THIS EDICT OF ASOKA (B. C. 250)

IS HERE PLACED

BY THE ASIATIC SOCIETY OF BENGAL

IN HONOR OF

THE PHILOSOPHER THE ANTIQUARIAN

AND THE PHILOLOGIST

BY WHOM

ITS CHARACTERS WERE FIRST DECYPHERED

JAMES PRINSEP.

The President and Members expressed their high approbation of this arrangement, as a just tribute to the memory of their ever-to-be-lamented Secretary and Associate.



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| Chezy, Yajnadattabada, ou La Mort D'yadnadatta, Text, Analysis and Translation. Paris, 1826, pages 142, 4to. | ... | ... | ... | ... | 3 | 8 |
| Chezy, La reconnaissance de Sacountala, Text and Translation. Paris, 1830, pages 665, 4to. | ... | ... | ... | ... | 10 | 0 |
| Geographie D'Aboulféda, Texte Arabe. Paris, 1837-40, pages 586, 4to. | ... | ... | ... | ... | 5 | 0 |
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| The Travels of Macarius, translated by P. C. Belfour. London, 1829, pt. I. 114 pages, 4to. | ... | ... | ... | ... | 4 | 0 |
| Memoir of the Emperor Jehanguire, translated from the Persian Manuscript, by Major D. Price. London, 1829, 141 pages, 4to. | ... | ... | ... | ... | 4 | 0 |
| History of the Afghans, translated from the Persian, by B. Dorn, part I. London, 1829, 184 pages, 4to. | ... | ... | ... | ... | 5 | 0 |
| Han-Koong-Tsew, or the Sorrows of Han, a Chinese Tragedy, translated by J. P. Davis. London, 1829, 28 pages, 4to. | ... | ... | ... | ... | 1 | 8 |

JOURNAL

OF THE

ASIATIC SOCIETY.

As-Soyúti's work on Earthquakes, called كشف الصلصلة عن وصف الزلزلة للسيوطي Kashf as-Salsalah 'an wasf Az-zal-zalah, i. e. removing the noise from the description of the Earthquakes, (or clearing up the description of Earthquakes.) Translated from the Arabic by A. SPRENGER, Esq. B. M. S.

Jelal-ed-din as-Soyúti, an Egyptian polygrapher of some merit, died in A. H. 911. He wrote this work on the occasion of an earthquake in Egypt, with a view of showing to his countrymen by a number of traditions which have been omitted in this translation, that earthquakes are ordained by God to punish men for their sins. At the same time the author wished to console them by showing them from history, that much more frightful punishments of this kind had taken place than the one under which they suffered in his time. This translation has been made from an Arabic MS. of the Royal Library at Paris, (fonds Asselin N. 218) which is neither very correct nor legible. A better copy is preserved in the library at Gotha. This translation, was not made with the view that it should ever be published, but it was merely intended as a sort of a hasty memorandum for the translator, it will therefore probably not stand the criticism of the philologist, though the student of Natural Philosophy may rely, that the facts are in general correctly rendered into English.—A. S.

It would appear that this is the original of the Persian work known amongst the native literati of the Western Provinces, by the name of 'Zelzele Namah,' for which enquiry was made sometime ago by Lieut. Baird Smith. See Proceedings of Nov. 1842, Vol. xi, p. 1201. Upon our mentioning it to Dr. Sprenger, he expressed this opinion, and has been kind enough to place this curious little Treatise at our disposal for the Journal.—Eus.

A. H. 94. On the 20th of Adar (March) an earthquake in Syria, which lasted forty days. Many buildings were destroyed in Antiochia.

98. Again for forty days, during the Khalifat of Omar Ben Abdul-aziz, in Syria.

130. There was an earthquake at Damascus, which was so violent, that the people were obliged to leave the town.

131. Several new shocks in Damascus.

180. In Egypt a very violent earthquake. The minaret of Alexandria was destroyed.

187. At Masisa المصيصة an earthquake and an inundation.

203. In Khorasan an earthquake which lasted seventy days; the mosque of Balkh and the fourth part of the town were destroyed.

219. Great darkness from noon until the evening.

220. Antiochia was destroyed by an earthquake, which lasted forty days.

224. An earthquake at Fergana, by which 15,000 persons perished.

225. An earthquake at Ahwaz for sixteen days; it was also felt in Jebal.

233. At Damascus many persons were buried under their houses; the earthquake extended to Antiochia, Mesopotamia, and Mausil. It is supposed that 50,000 persons perished.

232. Several earthquakes, more particularly in the Maghrib and in Syria, where the walls of Damascus and Emessa were destroyed. It was felt at Antiochia and El-Awassim العواصم in Mesopotamia and Mausil.

233. On Thursday, the 11th of Rabi-al-Akhar, many buildings were destroyed at Damascus by an earthquake.

234. At Herat, the houses were destroyed.

239. At Tiberias.

240. In the Maghrib, thirteen villages of Kairowan sunk.

242. In Shaban a very violent earthquake. At Tunis about 45,000 persons were buried under their houses; it extended also over Yemen, Khorasan, Fars, Syria, Bastam, بستم Komm قم Kashan, قاشان Rai, راي الدامغان el-Damaghan, Nishapur, Taberistan and Ispahan. The mountains fell down, and the earth opened so extensively that men could walk into it; and in the village El-sud السود in Egypt, five stones fell from heaven. One stone fell on the tent of a Bedouin and set it on fire. The weight of these stones was ten rotles. In Yemen a hill covered with fields moved from its place and became the property of another tribe.

245. Earthquakes prevailed over the whole earth, and many towns and bridges were destroyed.

At Antiochia a mountain fell into the sea, with 1005 houses. It had been covered with about ninety villages. The river disappeared one farsang's distance. Dreadful noises were heard at Tinnis.

In Mecca all the springs disappeared. The earthquake extended over Rakka, Harran, Ras el-'Ain, Emessa, Damascus, Rokha, Tarsus, Massissa and Adina. On the shores of Syria, in Laodicea, mountains moved with their inhabitants, and when it had destroyed *السِّن* El-son, it crossed the Euphrates, and was felt in Khorassan.

249. In Dhul Hajj was a very violent earthquake, at Rai the houses fell down, and the people took flight into the fields. •

258. At Wasit about 20,000 persons were buried under their houses, by an earthquake.

268. At Bagdad an earthquake, followed by torrents of rain and a thunder-storm.

280. At Ardebil six earthquakes took place in the course of this year; 100,000 persons died under the ruins of their houses. One of these earthquakes was preceded by an eclipse of the moon, darkness and wind.

288. An earthquake which lasted for some days.

289. In Rejeb at Bagdad, it lasted for some days.

On the day of Arafat which fell in summer, the wind was so cold, that the people were obliged to dress in furs.

300. A mountain split at Dinawar, and streams of water gushed out from it, which submerged many villages. A star split into three pieces, and this was followed by a frightful noise.

331. At Nesa many buildings tumbled down, and many people perished.

344. An earthquake in Egypt; it lasted three hours, and did great damage.

345. An earthquake at Hamadan, many lives were lost.

346. An earthquake at Rai and about that town, it lasted 40 days, then it discontinued for sometime, but it again returned. It extended to Talikán, and there sunk 150 villages belonging to Rai. At Rai a mountain sunk, and an enormous chasm opened from which water and smoke gushed out. •

347. An earthquake at Komm, Holwan, Kaman and Jebal, many people perished; at the same time Bagdad suffered from an earthquake.

During the reign of Kafur the Akhshidian, repeated shocks of earthquakes visited Egypt within the space of six months.

362. Several castles in Syria were ruined by an earthquake.

363. At Wasit.

376. Many persons perished under the ruins caused by an earthquake.

393. In Syria, Ābasim, and the Greek frontier, many castles were ruined by an earthquake.

398. In Shaban at Dinawar 10,000 persons perished under the ruins, besides those swallowed up by the ground. An inundation took place at Shifaz, and many ships were wrecked at sea.

During the reign of El-Hakim El-Obeidi, who ruled from 386 to 411 in Egypt, several earthquakes took place.

425. Many earthquakes took place in Egypt and Syria, by which one-third of Ramlah was destroyed. The walls of Jerusalem fell down, and many villages were swallowed up by the ground.

434. At Tebris, the fortress and the town were nearly destroyed by an earthquake, and about 40,000 persons perished. Many also perished at Tadmor and Balbek by the same cause.

438. Khelat and Diarbekr.

444. An earthquake in Ahwaz, by which much destruction was caused.

450. In the month of Shaban an earthquake at Bagdad, which extended to Hamadan and Tekrit.

455. Sha'ban; at Wasit, Antiochia, Laodicea, Sul, Akka and over all Syria. The walls of Tripolis were destroyed.

458. Jomadal Akhr in Khorassan, mountains were split, and many villages sunk under the inhabitants; some saved themselves by taking refuge in the open fields. Soyuti gives a copy of the document which was sent to Bagdad on this occasion. The earthquake is thus described:—"It caused the mountains to split; it cleft hills, overturned towns together with their inhabitants, and it levelled them with the ground in such a way that but few people escaped. Most buildings lay in ruins, and it is impossible to ascertain the number of those who perished."

تصدعت منها الجبال و تشققت منها التلال و انقلبت القرى
بأهلها واستوصلت من أصلها ولم يسلم من ساكنها الا القليل
و خرب أكثر بنيان البلد و هلك خلق لا يأتي عليهم العدد

460. Tuesday 11th Jomadalawwal, an earthquake in Palestine : Ramla was destroyed. It extended to the Hejaz. It reached also Wadi El-Szafr, Khaiber, Bedr, Yanba, Wadi-kora, Teima and Tabuk, and it extended as far as Kufa ; only two houses of Ramla remained, 25,000 persons perished. 'Aila was destroyed with all its inhabitants, the earthquake was also felt at Jerusalem. The sea receded from the coast, but soon returned again into its place. In all these countries it was felt at the same hour.

462. Tuesday 11th Jomadalawwal at Ramla, and its dependencies, Jerusalem and Egypt. One corner of the principal mosque of Cairo gave way ; it was immediately succeeded by two other earthquakes.

464. The earth trembled six times at Bagdad in one earthquake.

478. In Moharrem there was an earthquake at Arjan, under which many Greeks perished.

479. In Irak, in Mesopotamia and in Syria, many buildings were destroyed by an earthquake.

484. In Syria and elsewhere, many buildings, ninety villages, and the walls of Antiochia were destroyed by an earthquake.

508. In Mesopotamia thirteen villages belonging to Roha were destroyed, and part of the walls of Harran ; also in Elsun about 100 houses and one-half of the fortress were destroyed.

511. In the days of Arafat were many houses destroyed at Bagdad.

513. The 5th of Ramadan Kazwin was destroyed by an earthquake which returned the following year precisely at the same time.

515. In the Hejaz.

516. At Jannezah part of its wall sunk.

524. Rabi 1st, at Bagdad, many houses were destroyed.

529. At Bagdad several shocks ; it began on Thursday the 11th of Shawal and lasted the whole day, amounting to six shocks until Friday night. On the 17th, three shocks took place from midnight till day-break.

532. An earthquake in Syria, Mesopotamia and Irak ; many persons were buried under the ruins.

533. At Jannezah 130,000 persons lost their lives. Jannezah sunk, and the spot was covered with black water for the distance of ten farsangs ; also Aleppo suffered eighty shocks in one night. It was felt over all the world, but strongest in Aleppo.

538. On the 14th of Zu-l-ka'de, which fell on a Tuesday, was a great earthquake over all the world.

544. At Bagdad about ten shocks were felt, and a mountain fell near Holwan; the Turkomans suffered greatly.

549. A great fiery wind blew one evening: every body believed that the last day was come; this was succeeded by an earthquake; the water of the Tigris disappeared for a while, but made again its appearance.

550. An earthquake at Bagdad.

552. In Syria, the greater part of Aleppo was destroyed; there suffered also Hamat, Shaizar, Emessa, Hisn al Akrad (the fort of the Kurds,) Laodicea, Antiochia. In Shaizar only one woman and a slave were saved.

In Kafertâb not one individual was saved. In Affania the castle was swallowed up, and many towns of the Franks suffered. The walls of several towns of Syria were destroyed; the children perished in the schools, and no one came to ask for them.

551. And the following year several earthquakes took place in Syria.

551. In the night of Rabi 2nd, was a great earthquake. It was preceded and followed by others. In the night of the 25th, at Aleppo, Hamat, and many other places, there were about forty shocks. It was one of the most tremendous earthquakes. On the 29th of the same month, an earthquake took place towards the end of the day, and continued during the night.

The *first* of Ramazan three shocks.

On the *third* of the same month three earthquakes; one at noon, the others at midnight.

In the middle of Ramazan there was an earthquake at night, and another in the morning, and two during the following night, and another shock the subsequent day. In the night of the 23d of Ramazan and in the second of Shawal, new shocks of earthquakes were felt which were more violent than the preceding ones, there were also earthquakes on the 7th, 16th and 17th, and in the night of the 22d.

552. In the night of 19th of Safr, a great earthquake took place which was followed by another shock; a third one took place in the night of the 20th, and the following day in Syria. In the night of the 25th Jomada 1st, four shocks. In the night of the 4th of Jomada 2d, several shocks,

particularly at Aleppo and Emessa, where they were destructive ; also in Hamat, Kafertab, and Taima. In the 4th of Rajeb at day time at Damascus it was so violent, that never the like had been seen ; it caused some destruction. In the night of Friday the 8th of Rajeb there were three earthquakes, which were followed by other earthquakes on Saturday, Sunday and Monday night, and several shocks after that. It did great damage in Hamat, Shiraz, and Emessa. In Damascus it did not begin before Monday the 29th of Rejeb, but caused great consternation. Another earthquake took place on the 24th of Ramazan, which was terribly felt at Aleppo, and Hamat (Apamea,) where it continued for sometime with intermissions. In the night of Saturday the 10th of Shawal and in the night of the 10th of Dilkada, and on the night of the 23d and 25th of the same month, people were so frightened by earthquakes, that they took refuge in the fields. Apamea was destroyed.

565. An earthquake in Syria, Mesopotamia and almost all the world ; it destroyed many walls and houses in Syria, more particularly at Damascus, Emessa, Apamea, Aleppo and Balbek.

574. In Armenia and in the country of Irbil.

575. A great earthquake.

592. Great wind over all the world, and an earthquake in Egypt.

593. A large star was split, and a tremendous noise was caused by it, which made the earth tremble. This took place on Friday the 9th of Jomada 2d.

597. In Shawan, there was an earthquake almost over all the world, more particularly in Upper Egypt, where it caused great destruction ; it extended over Syria and the sea, Mesopotamia, the Greek Empire and Irak ; it was particularly destructive in Syria. It was also felt in Armenia, Azerbaijan, and it is calculated that through this earthquake 1,100,000 lives were lost. The first shock lasted but a short time, but after that it continued for several days, and it seems that it came from Mesopotamia to the sea-coast.

578. In Shaban at Emessa, the castle of the Kurds was destroyed ; it extended as far as Nablus.

600. An earthquake in Egypt, Mesopotamia, Syria, Mausil, Irak, the Greek Empire and Cyprus ; it extended* as far as Sabta in the Maghrib.

605. An earthquake at Nishapur, which lasted ten days.

608. In Egypt and Cairo many persons lost their lives, and great smoke arose west of Damascus.

623. On Monday, on the new moon of the latter Jomada, a noise was heard about Medina for two days, which was followed by a great earthquake, which caused great destruction.

657. In Egypt.

661. Mausil.

662. In Egypt.

667. In Sus, by which many castles were destroyed and many lives lost.

692. In the month of Safr at Ramla, Fakul and El-Kerk three villages were destroyed.

693. In Egypt.

702. On the 23d Dhillhajj, Thursday, in Egypt and Syria, many persons were buried under the ruins, and all Alexandria was submerged under the sea.

722. In Mohurrum at Damascus at night.

729. In Rajeb, at Tripolis and in Syria.

744. In Egypt and Syria.

741. On the 4th of Ramazan, two shocks in one hour at Cairo.

775. A slight earthquake at Cairo.

787. On the 13th of Shaban, slight earthquake at Cairo and Egypt.

788. The 18th Jomada 2nd, a slight earthquake.

791. Sufr at Nishapur, violent wind and earthquake; many souls lost.

Nishapur was seven times destroyed by earthquakes, but this time was the worst.

Aleppo and its dependencies suffered from earthquakes on Jomada 2nd, and Shawan and Jomada 1st; and besides that several times in the same year.

809. An earthquake in Antiochia, many lives lost.

811. In Shaban about Aleppo and Tripolis, many lives lost by earthquakes

822. At Arzangán ارزنگان and Constantinople.

825. At Cairo.

828. In Shaban, in Egypt, three shocks in one day.

834. In Shaban, at Granada, and in Spain.

838. In Rabi 2d at Cairo.
 841. In Shaban at Cairo, a slight earthquake.
 861. At Arzangán, the most part of which was destroyed.
 863. At Kerk 100 lives lost by an earthquake.
 881. In Egypt a slight earthquake at night.
 880. 17th of Mohurram, at noon, a violent earthquake in Egypt.
 888. The 9th of Jomada 1st, on Sunday, a slight earthquake.
 889. Rabi 1st, six or more terrible shocks at Aleppo.
 896. 12th Jomada 2d, on Sunday, a slight earthquake in Egypt.
 905. The night of Friday 27th Dilhadj, a slight earthquake.

*A general Statement of the Weather at Kotgurh and Soobathoo, for
 1819-20-21. By Captain PATRICK GERARD.*

| | | | | | | | |
|--|----|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | .. | 16 days |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 8 „ |
| Rainy and stormy, snow and hail, | .. | .. | .. | .. | .. | .. | 7 „ |
| Thunder, | .. | .. | .. | .. | .. | .. | none. |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23.740 | 45° |
| Minimum, | .. | .. | .. | 23.445 | 31° |
| Mean, | .. | .. | .. | 23.592 | 38° |

Temperature of the air.

Temperature of the house.

| | | | | | |
|---------------|----|--------|----------|----|-----|
| Maximum, | .. | No. | Maximum, | .. | 45° |
| Minimum only, | .. | 23° 1' | Minimum, | .. | 31° |
| Mean, | .. | No. | Mean, | .. | 38° |

Prevailing wind during the month, westerly, but generally very variable.

A general Statement of the Weather at Kotgurh, for February, 1819.

| | | | | | | |
|--|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | 11 days |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 8 „ |
| Rainy and stormy, snow and hail, | .. | .. | .. | .. | .. | 9 „ |
| Thunder, | .. | .. | .. | .. | .. | 1 „ |

*Height of the Barometer.*

| | | | | Inches. | Thermometer. |
|--|----|--------|---------------------------|---------|--------------|
| Maximum, | .. | .. | .. | 23.810 | 44° 5' |
| Minimum, | .. | .. | .. | 23.535 | 39° 1' |
| Mean, | .. | .. | .. | 28.672 | 41° 8' |
| Temperature of the air. | | | Temperature of the house. | | |
| Maximum, | .. | 45° 6' | Maximum, | .. | 47° 8' |
| Minimum, | .. | 27° 2' | Minimum, | .. | 37° 7' |
| Mean, | .. | 36° 4' | Mean, | .. | 2° 7' |
| Prevailing wind during the month easterly, but variable. | | | | | |

A general Statement of the Weather at Soobathoo, for March 1819.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 18 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 10 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 3 „ |
| Thunder, | .. | .. | .. | .. | .. | 3 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|---|----|--------|---------------------------|---------|--------------|
| Maximum, | .. | .. | .. | 26.110 | 68° |
| Minimum, | .. | .. | .. | 25.640 | 62° 7' |
| Mean, | .. | .. | .. | 25.875 | 65° 3' |
| Temperature of the air. | | | Temperature of the house. | | |
| Maximum, | .. | 80° | Maximum, | .. | 73° 5' |
| Minimum, | .. | 47° | Minimum, | .. | 50° |
| Mean, | .. | 63° 5' | Mean, | .. | 61° 7' |
| Prevailing wind during the month, south-westerly. | | | | | |

A general Statement of the Weather at Soobathoo, for April 1819.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 15 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 10 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 5 „ |
| Thunder, | .. | .. | .. | .. | .. | 4 „ |

*Height of the Barometer.*

| | | | | Inches. | Thermometer. |
|-------------------------|----|-----|----------|---------------------------|--------------|
| Maximum, | .. | .. | .. | 26.015 | 76° 2' |
| Minimum, | .. | .. | .. | 25.650 | 6° 5' |
| Mean, | .. | .. | .. | 25.832 | 70° 6' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | 88° | Maximum, | .. | 80° 5' |
| Minimum, | .. | 48° | Minimum, | .. | 61° |
| Mean, | .. | 68° | Mean, | .. | 70° 7' |

Prevailing winds during the month, south-west and south south-west.

A general Statement of the Weather at Kotgurh, for May 1819.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 12 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 5 „ |
| Rainy, stormy and hail, | .. | .. | .. | .. | .. | 14 „ |
| Thunder, | .. | .. | .. | .. | .. | 8 „ |

No Barometer up.

| Temperature of the air. | | | Temperature of the house. | | |
|-------------------------|----|-----|---------------------------|----|--------|
| Maximum, | .. | No. | Maximum, | .. | 69° |
| Minimum only, | .. | 42° | Minimum, | .. | 55° 3' |
| Mean, | .. | No. | Mean, | .. | 62° 1' |

Prevailing winds during the month, west and south-south-west.

A general Statement of the Weather at Soobathoo, for June 1819.

| | | | | | | |
|--|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | 9 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 11 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 10 „ |
| Thunder, | .. | .. | .. | .. | .. | 8 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 25.980 | 85° |
| Minimum, | .. | .. | .. | 25.640 | 77° 5' |
| Mean, .. | .. | .. | .. | 25.810 | 81° 2' |



Temperature of the air.

| | | |
|----------|-------|-----|
| Maximum, | .. | 93° |
| Minimum, | .. | 65° |
| Mean, | .. .. | 79° |

Temperature of the house.

| | | |
|----------|-------|-----|
| Maximum, | .. | 86° |
| Minimum, | .. | 70° |
| Mean, | .. .. | 78° |

Prevailing winds during the month, west and south-west, and south south-west.

A general Statement of the Weather at Kotgurh, for July 1819.

| | | |
|--|-------|---------|
| Clear, | .. .. | 2 days. |
| Fair, but cloudy and partially cloudy. | .. .. | 10 „ |
| Rainy and stormy, | .. .. | 19 „ |
| Thunder, | .. .. | 6 „ |

Height of the Barometer.

| | Inches. | Thermometer, |
|----------|---------|--------------|
| Maximum, | 23.730 | 73° 9' |
| Minimum, | 23.535 | 68° 1' |
| Mean, | 23.632 | 71° |

Temperature of the air.

| | | |
|---------------|----|--------|
| Maximum, | .. | No. |
| Minimum only, | .. | 55° 9' |
| Mean, | .. | No. |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 74° 9' |
| Minimum, | .. | 63° 5' |
| Mean, | .. | 69° 2' |

Prevailing winds during the month, east and east south-east.

A general Statement of the Weather at Kotgurh, for August 1819.

| | | |
|--|-------|--------|
| Clear, | .. .. | 1 day. |
| Fair, but cloudy and partially cloudy, | .. .. | 10 „ |
| Rainy and stormy, | .. .. | 20 „ |
| Thunder, | .. .. | 5 „ |

Height of the Barometer.

| | Inches. | Thermometer. |
|----------|---------|--------------|
| Maximum, | 23.765 | 72° 9' |
| Minimum, | 23.500 | 66° 5' |
| Mean, | 23.632 | 69° 7' |

Temperature of the air.

| | | |
|----------|----|-----|
| Maximum, | .. | No. |
|----------|----|-----|

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 73° 7' |
|----------|----|--------|



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and Soobathoo, for 1819-20-21.

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| | | | |
|------------------|--------|-------------|--------|
| Minimum only, .. | 57° 1' | Minimum, .. | 64° 2' |
| Mean, .. | No. | Mean, .. | 68° 9' |

Prevailing winds during the month, easterly.

A general Statement of the Weather, for September 1819.

Absent this month on a tour into the interior, but Thermometrical observations were daily taken and recorded at every place during the journey.

| | |
|--|---------|
| Clear, | 2 days' |
| Fair, but cloudy and partially cloudy, | 6 „ |
| Rainy and stormy. | 22 „ |
| Thunder, | 4 „ |

The prevailing winds during the month, easterly.

A general Statement of the Weather, for October 1819.

Still absent all this month on a tour into the interior.

| | |
|--|----------|
| Clear, | 19 days. |
| Fair, but cloudy and partially cloudy, | 6 „ |
| Rainy and stormy, snow and hail, | 6 „ |
| Thunder, | none. |

Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh, for November 1819.

| | |
|---|----------|
| Clear, | 23 days' |
| Fair, but cloudy and partially, cloudy, | 4 „ |
| Rainy, and stormy and snow, | 3 „ |
| Thunder, | 1 „ |

Height of the Barometer.

| | | Inches. | Thermometer. |
|------------------|--|---------|--------------|
| Maximum, | | 23.820 | 50° |
| Minimum, | | 23.600 | 46° |
| Mean, | | 23.610 | 48° |

Temperature of the air.

Temperature of the house.

| | | | |
|-------------|-----|-------------|-----|
| Maximum, .. | No. | Maximum, .. | 51° |
| Minimum, .. | 34° | Minimum, .. | 45° |
| Mean, | No. | Mean, | 48° |

Prevailing winds during the month, westerly.

*A general Statement of the Weather at Kotgurh, for December 1819.*

| | |
|--|----------|
| Clear, | 11 days. |
| Fair, but cloudy and partially cloudy. | 13 „ |
| Rainy, stormy and snow, | 7 „ |
| Thunder, | 1 „ |

Height of the Barometer.

| | Inches. | Thermometer. |
|-------------------------|-------------|---------------------------|
| Maximum, | 23.900 | 48° 5' |
| Minimum, | 23.600 | 43° |
| Mean, | 23.750 | 45° 7' |
| Temperature of the air. | | Temperature of the house. |
| Maximum, .. No. | Maximum, .. | 50° |
| Minimum, .. 30° 5' | Minimum, .. | 42° 8' |
| Mean, .. No. | Mean, .. | 46° 4' |

Prevailing winds during the month, easterly.

A general Statement of the Weather, for 1819.

| 1819. | Clear. days. | Fair, days. | Rainy, stormy, snow and hail days. | Thun- der days. |
|--------------------|-----------------|----------------|--|-----------------------|
| January, | 16 | 8 | 7 | none. |
| February, | 11 | 8 | 9 | 1 |
| March, | 18 | 10 | 3 | 3 |
| April, | 15 | 10 | 5 | 4 |
| May, | 12 | 5 | 14 | 8 |
| June, | 9 | 11 | 10 | 8 |
| July, | 2 | 10 | 19 | 6 |
| August, | 1 | 10 | 20 | 5 |
| September, | 2 | 6 | 22 | 4 |
| October, | 19 | 6 | 6 | none. |
| November, | 23 | 4 | 3 | 1 |
| December, | 11 | 13 | 7 | 1 |
| Total, | 139 | 101 | 125 | 41 |

NOTE.—In the absence of the Maximum Temperature of the air for some of the months, the Mean Temperature of the house will nearly come to the same result as if the Maximum Temperature of the air had been ascertained and recorded. Indeed in the course of many years' observations, the difference between the Mean Temperature of the air and that of the house, if any thing, is so trifling, that it is hardly deserving of notice.

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A general Statement of the Weather at Kotgurh, for January, 1820.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 26 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 3 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 2 „ |
| Thunder, | .. | .. | .. | .. | .. | 2 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|-------------------------|----|--------|----|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23·720 | 42° |
| Minimum, | .. | .. | .. | 23·570 | 41° |
| Mean, | .. | .. | .. | 23·645 | 41° 5' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | No. | | Maximum, | .. 34° |
| Minimum, only | .. | 30° 5' | | Minimum, | .. 36° |
| Mean, | .. | .. No. | | Mean, | .. 39° 5' |

Prevailing winds during the month, east, south-east and north-east.

A general Statement of the Weather at Kotgurh, for February, 1820.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 14 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 6 „ |
| Rainy and stormy, snow and hail, | .. | .. | .. | .. | .. | 9 „ |
| Thunder, | .. | .. | .. | .. | .. | 2 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|-------------------------|----|--------|----|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23·760 | 48° |
| Minimum, | .. | .. | .. | 23·400 | 42° 8' |
| Mean, | .. | .. | .. | 23·580 | 45° 4' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | No. | | Maximum, | .. 48° 2' |
| Minimum, only | .. | 27° | | Minimum, | .. 40° |
| Mean, | .. | .. No. | | Mean, | .. 44° 1' |

Prevailing wind during the month, westerly.

A general Statement of the Weather at Kotgurh, for March 1820.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 16 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 6 „ |



| | | | | | |
|----------------------------------|----|----|----|---|---|
| Rainy and stormy, snow and hail, | .. | .. | .. | 9 | „ |
| Thunder, | .. | .. | .. | 4 | „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|-------------------------|----|--------|----------|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23·860 | 54° |
| Minimum, | .. | .. | .. | 23·600 | 46° |
| Mean, | .. | .. | .. | 23·730 | 50° |
| Temperature of the air. | | | | Temperature of the house, | |
| Maximum, | .. | No. | Maximum, | .. | 54° 6' |
| Minimum, only | .. | 37° 5' | Minimum, | .. | 46° |
| Mean, | .. | No. | Mean, | .. | 50° 3' |

Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh for April 1820.

Absent all this month on a tour through the protected hill states, situate between the rivers Sutluj and Jumna, on the hither or Indian side of the Himalaya range, but observations were daily taken and recorded during the journey.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 13 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 4 „ |
| Rainy, stormy and hail, | .. | .. | .. | .. | .. | 13 „ |
| Thunder, | .. | .. | .. | .. | .. | 6 „ |

Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh for May, 1820.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear | .. | .. | .. | .. | .. | 13 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 8 „ |
| Rainy, stormy, and hail, | .. | .. | .. | .. | .. | 10 „ |
| Thunder, | .. | .. | .. | .. | .. | 8 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23·800 | 64° |
| Minimum, | .. | .. | .. | 23·520 | 65° 9' |
| Mean, | .. | .. | .. | 23·660 | 64° 9' |



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| Temperature of the air. | | | Temperature of the house. | | |
|-------------------------|-----|-----|---------------------------|----|--------|
| Maximum, | .. | No. | Maximum, | .. | 73° 4' |
| Minimum, only | 45° | | Minimum, | .. | 58° |
| Mean, | .. | No. | Mean, | .. | 65° 7' |

Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh, for June 1820.

| | | | | | | |
|---------------------------------------|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | 7 days. |
| Fair, but cloudy and partially cloudy | .. | .. | .. | .. | .. | 9 „ |
| Rainy, stormy and hail, | .. | .. | .. | .. | .. | 14 „ |
| Thunder, | .. | .. | .. | .. | .. | 6 „ |

Height of the Barometer.

| | | | Inches. | Thermometer. |
|----------|----|----|---------|--------------|
| Maximum, | .. | .. | 23·700 | 75° 4' |
| Minimum, | .. | .. | 23·440 | 67° 8' |
| Mean, | .. | .. | 23·570 | 71° 6' |

| Temperature of the air. | | | Temperature of the house. | | |
|-------------------------|----|--------|---------------------------|----|--------|
| Maximum, | .. | 87° 4' | Maximum, | .. | 77° 1' |
| Minimum, | .. | 54° | Minimum, | .. | 63° |
| Mean, | .. | 70° 7' | Mean, | .. | 70° |

Prevailing winds during the month, partly westerly and partly easterly.

A general Statement of the Weather at Kotgurh, for July 1820.

| | | | | | | |
|--|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | none. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 3 days. |
| Rainy and stormy, | .. | .. | .. | .. | .. | 28 „ |
| Thunder, | .. | .. | .. | .. | .. | 2 „ |

Height of the Barometer.

| | | | Inches. | Thermometer. |
|----------|----|----|---------|--------------|
| Maximum, | .. | .. | 23·730 | 70° 6' |
| Minimum, | .. | .. | 23·440 | 65° |
| Mean, | .. | .. | 23·585. | 67° 8' |
| | | | | 5 G |



| Temperature of the air. | | | Temperature of the house. | | |
|-------------------------|----|--------|---------------------------|----|--------|
| Maximum, | .. | 81° 8' | Maximum, | .. | 76° |
| Minimum, | .. | 57° 7' | Minimum, | .. | 64° 4' |
| Mean, | .. | 69° 7' | Mean | .. | 70° 2' |

Prevailing winds during the month, easterly.

A general Statement of the Weather at Kotgurh, for August 1820.

| | | | | | | | | |
|--|----|----|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | .. | .. | none. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | .. | 8 days. |
| Rainy and stormy, | .. | .. | .. | .. | .. | .. | .. | 23 „ |
| Thunder, | .. | .. | .. | .. | .. | .. | .. | 2 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|-------------------------|----|--------|----------|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23·710 | 69° 7' |
| Minimum, | .. | .. | .. | 23·515 | 69° |
| Mean, | .. | .. | .. | 23·612 | 69° 3' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | 77° 8' | Maximum, | .. | 74° |
| Minimum, | .. | 56° 5' | Minimum, | .. | 64° 6' |
| Mean, | .. | 67° 1' | Mean, | .. | 69° 3' |

Prevailing winds during the month, easterly.

A general Statement of the Weather at Kotgurh, for September 1820.

| | | | | | | | | |
|--|----|----|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | .. | .. | 5 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | .. | 11 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | .. | .. | 14 „ |
| Thunder, | .. | .. | .. | .. | .. | .. | .. | 2 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23·705 | 69° 4' |
| Minimum, | .. | .. | .. | 23·505 | 67° |
| Mean, | .. | .. | .. | 23·605 | 68° 2' |

Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 73° 7' |
| Minimum, | .. | 60° 7' |
| Mean, | .. | 67° 2' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 75° 9' |
| Minimum, | .. | 52° 8' |
| Mean, | .. | 64° 3' |

Prevailing winds during the month, easterly.

A general Statement of the Weather at Kotgurh, for October 1820.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 20 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 5 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 6 „ |
| Thunder, | .. | .. | .. | .. | .. | 3 „ |

Height of the Barometer.

| | Inches. | Thermometer. |
|----------|-----------|--------------|
| Maximum, | .. 23·835 | 58° |
| Minimum, | .. 23·535 | 62° 4' |
| Mean, | .. 23·685 | 60° 2' |

Temperature of the air.

| | |
|----------|-----------|
| Maximum, | .. 71° |
| Minimum, | .. 43° 8' |
| Mean, | .. 57° 4' |

Temperature of the house.

| | |
|----------|-----------|
| Maximum, | .. 68° 2' |
| Minimum, | .. 52° |
| Mean, | .. 60° 1' |

Prevailing winds during the month, easterly and westerly.

A general Statement of the Weather at Rampoor, for November 1820.

No Barometer with me.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 18 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 7 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 5 „ |
| Thunder, | .. | .. | .. | .. | .. | 1 „ |

Temperature of the air.

| | |
|----------|-----------|
| Maximum, | .. 78° 4' |
| Minimum, | .. 37° 6' |
| Mean, | .. 58° |

Temperature in a tent.

| | |
|----------|-----------|
| Maximum, | .. 79° |
| Minimum, | .. 54° |
| Mean, | .. 66° 5' |

Prevailing winds during the month at this place, south-west and south south-west.

*A general Statement of the Weather, at Rampoor for December 1820.*

| | |
|--|----------|
| Clear, | 17 days. |
| Fair, but cloudy and partially cloudy, | 10 „ |
| Rainy, stormy and snow, | 4 „ |
| Thunder, | none. |

Temperature of the air.

| | |
|-------------|--------|
| Maximum, .. | 72° 7' |
| Minimum, .. | 32° 7' |
| Mean, .. . | 52° 7' |

Temperature in a tent.

| | |
|---------------|-----|
| Maximum, .. | No. |
| Minimum, only | 39° |
| Mean, .. | No. |

Prevailing winds during the month at this place, south-west and south south-west.

A general Statement of the Weather for 1820.

| 1820. | Clear days. | Fair days. | Rainy and stormy, snow and hail days. | Thunder days. |
|--------------------|-------------|------------|---------------------------------------|---------------|
| January, | 26 | 3 | 2 | 2 |
| February, | 14 | 6 | 9 | 2 |
| March, | 16 | 6 | 9 | 4 |
| April, | 13 | 4 | 13 | 6 |
| May, | 13 | 8 | 10 | 8 |
| June, | 7 | 9 | 14 | 6 |
| July, | none | 3 | 28 | 2 |
| August, | ditto | 8 | 23 | 2 |
| September, | 5 | 11 | 14 | 2 |
| October, | 20 | 5 | 6 | 3 |
| November, | 18 | 7 | 5 | 1 |
| December, | 17 | 10 | 4 | none |
| Total, | 149 | 80 | 137 | 38 |

Note.—Having been obliged to proceed to and remain at this place on duty, it may be as well to mention, that Rampoor is a small town and the capital of Bussahir, about 22 miles beyond the military outpost of Kotgurh, situate on the left bank of the Sutlej, and the winter residence of the Rajah of that state. It is in latitude 31° 27' and longitude 77° 38' and its elevation above the level of the sea by Barometrical observation is 3,398 feet.

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A general Statement of the Weather at Kotgurh, for January 1821.

No Barometer up.

| | | | | | | | |
|--|----|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | .. | 11 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 12 .. |
| Rainy, stormy, snow and hail, | .. | .. | .. | .. | .. | .. | 8 .. |
| Thunder, | .. | .. | .. | .. | .. | .. | none. |

Temperature of the air.

Temperature of the house.

Maximum, .. 52° 2'

Maximum, .. 47° 8'

Minimum, .. 28° 4'

Minimum, .. 36° 8'

Mean, .. 40° 3'

Mean, .. 42° 3'

* Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh, for February 1821.

| | | | | | | | |
|--|----|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | .. | 11 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 14 .. |
| Rainy, stormy and hail, | .. | .. | .. | .. | .. | .. | 3 .. |
| Thunder, | .. | .. | .. | .. | .. | .. | 2 .. |

Temperature of the air.

Temperature of the house.

Maximum, .. 68° 7'

Maximum, .. 59°

Minimum, .. 29°

Minimum, .. 37°

Mean, .. 48° 8'

Mean, .. 48°

Prevailing winds during the month, partly west and partly east.

A general Statement of the Weather at Soobathoo, for March 1821.

| | | | | | | | |
|--|----|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | .. | 18 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 5 .. |
| Rainy, stormy and hail, | .. | .. | .. | .. | .. | .. | 8 .. |
| Thunder, | .. | .. | .. | .. | .. | .. | 4 .. |

Height of the Barometer.

| | | | Inches. | Thermometer. |
|----------|----|----|---------|--------------|
| Maximum, | .. | .. | 26.105. | 71° 3' |
| Minimum, | .. | .. | 25.780. | 59° 8' |
| Mean, | .. | .. | 25.942. | 65° 5' |

Temperature of the air.

| | |
|-------------|--------|
| Maximum, .. | 78° 5' |
| Minimum, .. | 48° 3' |
| Mean, .. | 63° 4' |

Temperature of the house.

| | |
|-------------|--------|
| Maximum, .. | 73° |
| Minimum, .. | 56° |
| Mean, .. | 64° 5' |

Prevailing wind during the month, westerly.

A general Statement of the Weather at Soobathoo, for April 1821.

| | | | | | | |
|---|----|----|----|----|----|----------|
| Clear, .. | .. | .. | .. | .. | .. | 18 days. |
| Fair, but cloudy and partially cloudy, .. | .. | .. | .. | .. | .. | 9 „ |
| Rainy, stormy and hail, .. | .. | .. | .. | .. | .. | 3 „ |
| Thunder, .. | .. | .. | .. | .. | .. | 4 „ |

Height of the Barometer.

| | | | Inches. | Thermometer. |
|---|--------|-------------|---------------------------|--------------|
| Maximum, .. | .. | .. | 26.200. | 73° |
| Minimum, .. | .. | .. | 25.850. | 67° 8' |
| Mean, .. | .. | .. | 26.025. | 70° 4' |
| Temperature of the air. | | | Temperature of the house. | |
| Maximum, .. | 87° 4' | Maximum, .. | 81° 4' | |
| Minimum, .. | 54° 5' | Minimum, .. | 64° 8' | |
| Mean, .. | 70° 9' | Mean, .. | 73° 1' | |
| Prevailing winds during the month, west and south-west. | | | | |

A general Statement of the Weather at Kotgurh, for May 1821.

| | | | | | | |
|---|----|----|----|----|----|----------|
| Clear, .. | .. | .. | .. | .. | .. | 15 days. |
| Fair, but cloudy and partially cloudy, .. | .. | .. | .. | .. | .. | 6 „ |
| Rainy, stormy and hail, .. | .. | .. | .. | .. | .. | 10 „ |
| Thunder, .. | .. | .. | .. | .. | .. | 10 „ |

Height of the Barometer.

| | | | Inches. | Thermometer. |
|-------------|----|----|---------|--------------|
| Maximum, .. | .. | .. | 23.670. | 82° 7' |
| Minimum, .. | .. | .. | 23.530. | 64° 5' |
| Mean, .. | .. | .. | 23.600. | 73° 6' |



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Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 85° |
| Minimum, | .. | 50° 2' |
| Mean, | .. | 67° 6' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 82° 7' |
| Minimum, | .. | 63° 6' |
| Mean, | .. | 73° 1' |

Prevailing winds during the month, westerly.

A general Statement of the Weather at Kotgurh, for June 1821.

| | | | | | | | |
|--|----|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | .. | 18 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 4 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | .. | 8 „ |
| Thunder, | .. | .. | .. | .. | .. | .. | 5 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23·795. | 75° |
| Minimum, | .. | .. | .. | 23·480. | 72° 3' |
| Mean, | .. | .. | .. | 23·637. | 73° 6' |

Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 88° 4' |
| Minimum, | .. | 56° |
| Mean, | .. | 72° 2' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 81° 3' |
| Minimum, | .. | 65° 4' |
| Mean, | .. | 73° 3' |

Prevailing wind during the month, westerly.

A general Statement of the Weather at Kotgurh, for July 1821.

| | | | | | | | |
|--|----|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | .. | none. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | .. | 10 days. |
| Rainy and stormy, | .. | .. | .. | .. | .. | .. | 21 „ |
| Thunder, | .. | .. | .. | .. | .. | .. | 5 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23·760. | 73° 7' |
| Minimum, | .. | .. | .. | 23·470. | 70° |
| Mean, | .. | .. | .. | 23·615. | 71° 8' |



Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 85° 3' |
| Minimum, | .. | 59° 4' |
| Mean, | .. | 72° 3' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 81° 5' |
| Minimum, | .. | 66° |
| Mean, | .. | 73° 7' |

Prevailing winds during the month, west and east-north-east.

A general Statement of the Weather at Kotgurh, for August 1821.

| | | | | | | | | |
|--|----|----|----|----|----|----|----|-------|
| Clear, | .. | .. | .. | .. | .. | .. | .. | none. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 12 | .. | .. |
| Rainy and stormy, | .. | .. | .. | .. | .. | 19 | .. | .. |
| Thunder, | .. | .. | .. | .. | .. | 2 | .. | .. |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|-------------------------|----|--------|----|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23.695. | 73° |
| Minimum, | .. | .. | .. | 23.530. | 66° 2' |
| Mean, | .. | .. | .. | 23.612. | 69° 6' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | 75° | | Maximum, | .. 75° 1' |
| Minimum, | .. | 58° | | Minimum, | .. 62° |
| Mean, | .. | 66° 6' | | Mean, | .. 68° 5' |

Prevailing winds during the month, north-east and east-north-east.

A general Statement of the Weather at Kotgurh, for September 1821.

| | | | | | | | |
|--|----|----|----|----|----|----|---------|
| Clear, | .. | .. | .. | .. | .. | .. | 6 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 8 | .. |
| Rainy and stormy, | .. | .. | .. | .. | .. | 16 | .. |
| Thunder, | .. | .. | .. | .. | .. | 3 | .. |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23.875. | 69° 6' |
| Minimum, | .. | .. | .. | 23.680. | 59° 6' |
| Mean, | .. | .. | .. | 23.777. | 64° 6' |



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Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 76° 3' |
| Minimum, | .. | 48° 7' |
| Mean, | .. | 62° 5' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 75° 5' |
| Minimum, | .. | 48° 5' |
| Mean, | .. | 62° |

Prevailing winds during the month, west and east-north-east.

A general Statement of the Weather at Kotgurh, for
October 1821.

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 25 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 1 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 5 „ |
| Thunder, | .. | .. | .. | .. | .. | 1 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|----------|----|----|----|---------|--------------|
| Maximum, | .. | .. | .. | 23.930. | 63° |
| Minimum, | .. | .. | .. | 23.650. | 55° |
| Mean, | .. | .. | .. | 23.790. | 59° |

Temperature of the air.

| | | |
|----------|----|--------|
| Maximum, | .. | 67° |
| Minimum, | .. | 41° 4' |
| Mean, | .. | 54° 2' |

Temperature of the house.

| | | |
|----------|----|--------|
| Maximum, | .. | 66° 7' |
| Minimum, | .. | 51° |
| Mean, | .. | 58° 8' |

Prevailing winds during the month, west and east-north-east.

A general Statement of the Weather at Kotgurh, for
November 1821.

| | | | | | | |
|--|----|----|----|----|-----|----------|
| Clear, | .. | .. | .. | .. | .. | 19 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 9 „ |
| Rainy and stormy, | .. | .. | .. | .. | .. | 2 „ |
| Thunder, | .. | .. | .. | .. | .. | none. |
| | | | | | 5 H | |

*Height of the Barometer.*

| | | | | Inches. | Thermometer. |
|---|----|--------|----|---------------------------|--------------|
| Maximum, | .. | .. | .. | 23·860. | 58° 6' |
| Minimum, | .. | .. | .. | 23·600. | 49° |
| Mean, | .. | .. | .. | 23·730. | 53° 8' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | 59° 8' | | Maximum, | .. 59° |
| Minimum, | .. | 42° | | Minimum, | .. 48° 3' |
| Mean, | .. | 50° 9' | | Mean, | .. 53° 6' |
| Prevailing winds during the month, west and south-west. | | | | | |

*A general Statement of the Weather at Soobathoo, for
December 1821.*

| | | | | | | |
|--|----|----|----|----|----|----------|
| Clear, | .. | .. | .. | .. | .. | 14 days. |
| Fair, but cloudy and partially cloudy, | .. | .. | .. | .. | .. | 12 „ |
| Rainy and stormy, snow and hail, | .. | .. | .. | .. | .. | 5 „ |
| Thunder, | .. | .. | .. | .. | .. | 1 „ |

Height of the Barometer.

| | | | | Inches. | Thermometer. |
|---|----|--------|----|---------------------------|--------------|
| Maximum, | .. | .. | .. | 26·100. | 59° 6' |
| Minimum, | .. | .. | .. | 25·900. | 52° |
| Mean, | .. | .. | .. | 26·000. | 55° 8' |
| Temperature of the air. | | | | Temperature of the house. | |
| Maximum, | .. | 66° | | Maximum, | .. 59° 6' |
| Minimum, | .. | 39° 5' | | Minimum, | .. 49° |
| Mean, | .. | 52° 7' | | Mean, | .. 54° 3' |
| Prevailing winds during the month, west and south-west. | | | | | |

A general Statement of the Weather, for 1821.

| 1821. | Clear days. | Fair days. | Rainy and stormy, snow and hail days | Thunder days. |
|--------------------|-------------|------------|--------------------------------------|---------------|
| January, | 11 | 12 | 8 | none. |
| February, | 11 | 14 | 3 | |
| March, | 18 | 5 | 8 | |
| April, | 18 | 9 | 3 | |
| May, | 15 | 6 | 10 | |
| June, | 18 | 4 | 8 | |
| July, | none | 10 | 21 | |
| August, | none. | 12 | 19 | |
| September, | 6 | 8 | 16 | |
| October, | 25 | 1 | 5 | 2 |
| November, | 19 | 9 | 2 | none. |
| December, | 14 | 12 | 5 | 1 |
| Total, | 155 | 102 | 108 | 38 |

Note.—It appears necessary here to remark, that during the years 1819-20 and 21, Simla was no place of resort for invalids and visitors, except for few officers belonging to the 1st Nussereee Battalion stationed at Soobathoo, and thither they proceeded for the hottest months, May and June, till the rains had fairly set in. In 1819, a double-poled tent was pitched by Lieutenant, now Lieutenant Colonel R. Ross, on the north-west extremity of the ridge, immediately above the small village of Simla, and afterwards thatched over, having for its walls, spars, grass and mud as a protection from the weather, and being on the site of the Commander-in-Chief (Sir H. Fane's,) now Major General Lumley's house. In 1822, the first permanent cottage, of the usual materials, stone and timber, roofed with pine wood shingles, was erected on a rising ground on a small height on the same ridge by Captain, now Major C. P. Kennedy, the successor of Lieutenant R. Ross, as Assistant Political Agent for the Protected Hill States, and although the out-post of Kotgurh is 650 or 700 feet lower in elevation than Simla, being four long marches beyond it, and further into the interior, and not subject to the influence of the plains, which Simla is in a more or less degree, yet the temperature at Kotgurh for the above years will give a very fair notion of that which may be generally experienced at Simla, as in subsequent years, on comparison, the average temperature of the former place, proved only to be a trifle lower than that observed and recorded at the latter.

P. GERARD.

Supplementary Note to Mr. Commissioner LUSHINGTON'S Report on the Copper Mines of Kemaon and Ghurwal, Journal, p. 472.

Since the above report was submitted to Government in 1841, I have had the pleasure of meeting and forming the acquaintance of Captain Drummond, (late one of the Cabool hostages,) to whom allusion is made in the first part of the report, as having suggested the experimental working of the Pokree mine. Captain Drummond's opinion is, I believe, still favourable to further experiments being made in the Kemaon and Ghurwal mines under European superintendence, and as he has seen and examined all the papers connected with Mr. Wilkin's operations, and knows much more of these matters than I can pretend to do, his opinion is likely to be more correct than mine.

As connected with Mr. Wilkin, there is one important omission in my report, which in justice to him I would wish to supply. I allude to his uniformly kind and conciliating treatment of the Natives, and to the fact of my never having had a single complaint preferred to me by any of them, in the least affecting his character, from the time of his location at Pokree to the date of his departure from the province.

Almora, 29th August, 1843.

G. S. LUSHINGTON.

Note on a Fossil Antelope, from the Dadoopoor Museum. By Capt. W. E. BAKER, Bengal Engineers.

We have had great pleasure in doing full justice, as far as our humble efforts could do so, to this highly interesting notice, in procuring the aid of the best artist in Calcutta, who, our readers may be assured, has given a most exact *fac simile* of Captain Baker's capital pen and ink drawing.—Eds.

Among the notices of the Sub-Himalayan fossils which have from time to time appeared in the Journal of the Asiatic Society, but few have been devoted to the remains of Ruminantia. The Sivatherium indeed was one of the first described, and the Camelidæ subsequently formed the subject of a paper by Capt. Cautley and Dr. Falconer; but the various species of Bos, Cervus, Antelope, &c. which

occur in this deposit more frequently perhaps than any other, have hitherto passed unnoticed.

To supply this deficiency, however, is not my present purpose. I have neither leisure, nor a sufficiently extensive museum of comparative Osteology, to attempt the description, or even the classification of our fossil Ruminants; but it appeared to me to be a circumstance deserving the attention of other enquirers, that there is a strong resemblance between the skulls of some of our Antelopes, and those figured in Capt. Harris's splendid work, "Portraits of Game and Wild Animals in Southern Africa."

The degree of resemblance will be judged from the accompanying plate, in which Fig. 1 and 2, represent a front and side view of one of the fossils above alluded to, about one-fourth the natural size. The face of this fossil is tolerably perfect, excepting the extremities of the intermaxillary bones, but the occipital portion of the head and the tips of the horns are wanting.

Fig. 3 and 4 are similar views of the skull of an Indian Antelope, (*A. cervicapra*), drawn on the same scale.

Fig. 5 and 6 are outlines of the heads respectively of the Hartebeest, (*Acronotus Caama*), and the "Sassaybe," (*Acronotus lunata*), copied from Capt. Harris's plate.

The fossil differs from the Indian Antelope, in the greater elongation of its face, the straightness of its profile, the close juxta-position of its horns at the base; the absence or small development of the infra-orbital sinus, and the small size of the supra-orbital foramina. In all these respects it resembles one or other of the African genera, from the descriptions of which, by Capt. Harris, I have extracted the following:—

Acronotus Caama or Hartebeest. "Head remarkably heavy, narrow and long. Horns seated upon the summit of a beetling ridge above the frontals; very close together, and almost touching at the base. No suborbital sinus, but a constant mucous discharge of a waxy nature."

Acronotus Lunata, or Sassaybe. "Head long, narrow and shapeless; wearing a bubaline appearance, facial line straight. Eyes high in the cranium, indistinct lachrymary perforation."

As far therefore as can be judged from a description which, like the above, has no particular reference to the Osteology of these animals,



Fig 1

Fig 2

Fig 3

Fig 4

Fig 6

Fig 5

they appear to have a considerable resemblance to our fossil. It would be highly interesting, should they be hereafter identified, and should it thus appear that the groups of grotesque Ruminants now apparently confined to the Prairies of Africa, had once a wider distribution. The assemblage in one deposit of animals differing so widely in their forms and habits, and in their adaptations to particular localities, leads irresistibly to the conclusion, that we have before us the delta of a large river, which, in one of the past configurations of our globe, must have collected in its course the various spoils of some extensive continent. No existing river, excepting perhaps the Nile, could unite in one vast cemetery the remains of every known order of terrestrial Mammalia and aquatic reptiles; of the denizens of the forest, the lake and the mud bank, mingled with those of the wide prairie and the sandy desert.

A Ninth Memoir on the LAW OF STORMS IN INDIA; being the Pooree and Cuttack Storms of 2nd, and the Gya and Patna Storms of 5th and 6th October, 1842. By HENRY PIDDINGTON.

I had at first intended to include these storms in my preceding Memoir as a second part, but as, when a storm or storms in different parts of the ocean or on shore can be tolerably well traced, there may be some advantage, particularly when the tracks approach the Sandheads, in keeping the documents apart in different Memoirs and tracing them upon a separate chart. I have preferred doing so in this instance, and I have published the Madras storm first, forming the Eighth Memoir, as being of the two that which was of the highest interest, though the present are of a prior date.

On the 2nd October, the coast about Pooree and Cuttack was visited by a severe storm, which was felt as a gale at the Sandheads to the north, and to about lat. $17\frac{1}{2}$ to the southward. In some parts of its progress it appears to have been excessively severe, and two large ships, at least the *Acasta** and *Imaum Shah*, if not more, foundered within these limits; besides many coasting vessels.

* By an advertisement in the papers it would appear, that a ship of about 300 tons had sunk in eighteen feet water off Juggernath Pagoda about the time of this storm, which was supposed to be the *Acasta* from Madras.

At Calcutta, being at the time very unwell, I could not register any observation; but those of the Surveyor General's Office are given in their place. It will be seen from the documents and charts, that these storms are a remarkable instance either of two separate storms of small extent coming up together, or, which I am inclined to suppose, a large storm dividing itself into two small ones, and travelling up with great rapidity towards the coast. The grounds for these views will be as usual shewn in the summary which follows the documents and comparative table. The storms at sea were followed on the 5th and 6th of October, by severe inland storms from Gya to Patna, extending to Benares and other places; but having scarcely any documents from the stations between Cuttack and Gya, we cannot say with any certainty, that the two sets of storms were connected.

Abridged Log of the Ship Essex, Captain W. H. BROWN, from Madras to Calcutta, Civil time. Barometer corrected to that at the Surveyor General's Office. From the Marine Board.

The *Essex* left Madras on the 29th September 1842, and reached lat. (by account) 16° , long. $83^{\circ} 50'$ E. by noon on 1st October, having had variable winds.

P. M. Cloudy; 6, squally with rain, much lightning to N. W.; 8, squally, very vivid lightning from N. W. to N. E. Dense black clouds to northward; 9, wind W. N. W. wind increasing and cross sea rising; 10, increasing; midnight hard squalls with high sea from N. N. E. Barometer falling, double-reefed the topsails, high confused sea running from N. W., N. W. and N. E. very heavy rain.—8 P. M. Bar. 29.836. Ther. 82.—10 ditto, Bar. 29.766. Ther. 81—Midnight, Bar. 29.586. Ther. 80.

Sunday, 2nd October.—Gale increasing, very heavy rain and hard squalls, sea very high and confused, wind veering suddenly from S. W. to N. W. and back again; 6-30, a very vivid flash of lightning and sudden awful crash of thunder burst immediately over the mast heads making the ship tremble; very hard squalls 7-30. At 7 A. M. Bar. 29.436. Ther. 81.—9 ditto, Bar. 30, 29.406, Ther. 82.—Noon, Bar. 29.406. Ther. 84.—2 P. M. Bar. 29.436, Ther. 83.

Rain falling in torrents; 9-30, furled the fore top sail and hove the ship to, with head to N. N. Westward, wind then settled at West. Noon no rise in the mercury, secured every thing, and made snug for bad weather. Latitude account $17^{\circ} 10'$ N., longitude $85^{\circ} 30'$ E.; p. m. squalls very heavy, but clouds more broken. It had previously been very thick and very oppressive, wind W. N. W. At 2, the mercury which had been stationary since 10 a. m. began to rise. At 5 p. m. moderating, squalls less severe, and not continually raining as it had previously done; made a little sail and bore up to the E. N. Eastward, wind settled at W. S. W. clearing up. Night fine and starlight, with passing light squalls, made all sail, sea going down fast.—8 p. m. Bar. 29.836, midnight 29.336.

Monday.—Fine weather; Noon latitude $19^{\circ} 10'$ N., longitude $89^{\circ} 25'$.—Barometer 29.886.

*Extract from the Log of the French Ship Lion, Captain E. BONNET.
Reduced to civil time.*

The *Lion* left Karical on the evening of the 30th September, passed in sight of Pondicherry, and at noon 1st October was in lat. $13^{\circ} 0'$ N., long. $19^{\circ} 21'$ E. of Paris, ($80^{\circ} 41'$ Greenwich.) p. m. and to midnight cloudy, an 8 knot breeze from W. N. W.

2nd October.—Weather and sea increasing, steering 9 knots per hour to N. E. with winds from S. W. to W. S. W. Noon latitude $15^{\circ} 9'$ N., longitude $83^{\circ} 01'$. p. m. ($85^{\circ} 21'$ Greenwich.) p. m. bad appearances, shortened sail at midnight; going 7 knots to N. E., wind S. W., less sea and wind.

3rd October.—Wind to noon S. S. W. At noon fine weather, very heavy sea, latitude $17^{\circ} 20\frac{1}{2}'$, longitude E., Paris $85^{\circ} 21'$ ($87^{\circ} 41'$ Greenwich). From noon 2nd, a current of 90' to the Eastward.* p. m. fine weather to midnight; out reefs.

4th October.—a. m. squally but fine, a good deal of sea. At $\frac{1}{2}$ past 9, saw a ship which we passed at 10; she had lost her foremast, but made no signals; stood on. Noon latitude $20^{\circ} 23'$ N., sounding 80 fathoms, mud.

* This is worth remarking, as probably the effect of the storm wave.

Dr. CUMBERLAND, the Civil Surgeon of Pooree, has kindly obliged me with the following very clear account of this Storm, as experienced at that station :—

We have lately had a very severe gale at Pooree, the particulars of which I subjoin. The gale commenced on the night of the 1st instant, blowing hard from North, with rain. It continued to increase during the 2nd, occasionally blowing in very heavy gusts, with rain from North. At 6 P. M. the wind which had blown from due N. shifted to E. N. E. when there was an abatement in the violence of the storm. At 6½ P. M. it re-commenced with renewed violence, accompanied with thunder and lightning. At 8 P. M. blowing very heavily from S. E. At 9 P. M. more moderate, heavy rain. At 10 P. M. furious gusts from S. S. E. At 11½ P. M. more moderate. At 12½, heavy gusts from South, thunder and lightning, then again more moderate. At 1½ A. M. of the 3rd, violent gusts from S. after which the gale abated, leaving a brisk gale from South, and towards evening S. S. W., gradually diminishing. The 4th was fine with fresh S. W. breezes. The height of the thermometer on the 2nd was 78°, lowest 76°. Quantity of rain from 8 A. M. of the 2nd to 8 A. M. of the 3rd, 5 inches and ten-tenths. The damage occasioned by this gale both at sea and in shore is immense; no less than six coasting vessels were wrecked within a few miles of Pooree, and the "*Imaum Shah*," 700 tons burthen, foundered off the coast, only four hands saved out of 100 on board. The Nacoda told me that he was at anchor somewhere about the Sandheads when the gale commenced from the Westward; however there is no reliance to be placed on that. The poor man lost his wife and family, and I dare say was somewhat bewildered. The town of Pooree presents a sad scene of devastation, and a great many people have been killed. To give you an idea of the violence of the storm I may mention, that it was about one-eighth more violent than that of April 1840, an account of which both the late Mr. Ewart and myself forwarded to you.* I have had letters from Cuttack to-day, dated the 4th. There I am informed on the 2nd, they had a smart storm, only a few trees blown down, but no material injury done. Cuttack is 50 miles north of Pooree, so that it appears to have confined its ravages more to the coast.

Pooree, 5th October, 1842.

R. B. CUMBERLAND,
Civil Assistant Surgeon.

* See Jour. As. Soc. Vol. ix, p. 1021. Third Memoir on Law of Storms in India.

DR. MINTO, *Civil Assistant Surgeon at Cuttack, obligingly sends me the following account of the gale as experienced there:—*

Being unable to take particular notes of the weather during the last few days I applied to a friend to favor me with his, and as they may be useful to you, I transmit a copy.

1st October.—First part heavy rain; noon N. N. E. and N. E. *strong* breeze; 8 P. M. increasing breeze North, fresh gale and heavy squalls of rain.

2nd.—First part North, fresh gale and heavy squalls from North, N. N. E. and N. E. noon increasing gale, North and N. N. E.; 4 P. M. strong gale North, furious squalls from N. and N. E.; midnight a rasping gale N. and N. N. E; heavy rain.

3 A. M. a lull; 6 A. M. a strong breeze from E. S. E. and S. E.; increasing breeze and cloudy; latter part moderate breeze and cloudy.

I should say the strength of the gale, which came with heavy squalls of rain, was from noon until sun-set of the 2nd. From the evening of the 1st until day-light of the 3rd, three inches of rain fell. There has little injury been done to property, considering the severity of the weather, I mean in the immediate neighbourhood of Cuttack.

A. MINTO,

Assistant Civil Surgeon.

Englishman, 25th October, 1842.

ARRIVAL.

25th October.—Ship *Juddah Rohoman*, Nacoda, from Muscat 30th August.

REMARKS.

The *Juddah Rohoman* driven out from the Sandheads on the 30th September in a severe gale of wind from the Eastward, lost fore and main-masts by the board, and was obliged to throw a quantity of cargo overboard, to lighten the ship. On the 2nd of October in company with a large ship of 600 tons with nothing left but her bowsprit, she made various signals, but we could not understand them, in one hour afterwards no trace of her could be seen, supposed her to have foundered, it blowing hard at the time and a tremendous sea running; this took place in latitude $19^{\circ} 11' N.$, longitude $87^{\circ} 58' E.$

The Ship Eliza was outward bound, and put to sea from the Sand-heads at the commencement of the storm. Captain McCarthy has obligingly communicated the following graphic account of it to me through Messrs. Cockerell and Co., of which I have only abridged those manœuvres and preparations which every seaman understands to be matter of course, which would not be intelligible to other readers, and which do not serve to throw any light upon our subject.

Report of Capt. McCARTHY, Ship Eliza, civil time.

30th September, 1842.—Civil time A. M. Light breeze from the southward and fine weather; at 3 A. M. hove up and made all sail down from Saugor Point, set all studding sails; at noon light winds from N. N. E. to N. N. W. and fine weather. Barometer 29.80. Thermometer 84.0. Steering down Channel, a very heavy rolling hollow swell and all possible sail set. The heavy head swell continued all the way down Channel. At 2 hours 50 minutes, Mr. Hand, Pilot, left the ship about two miles above the outer Floating Light, and went up in the steamer. Increasing breezes and cloudy, *a strong Westerly set,** steering S. S. E. $\frac{1}{2}$ E.; at 7 P. M. the Light Vessel North, wind from N. N. E. to N. N. W., a heavy dark appearance from the S. E.; from sunset to 9 P. M. light winds from Northward with much, very vivid, lightning to the S. E., threatening appearance and incessant lightning; at 11 Barometer 29.78. Smart squall from S. E. with very heavy rain. The Barometer stationary as well as the Sympiesometer, heavy rain continued. At midnight fell calm, with baffling airs from Northward and Southward alternately.

1st October.—An increasing breeze from N. N. E., steering S. S. E. $\frac{1}{2}$ E. about five knots; a turbulent cross sea on, but not high. 4 A. M. strong N. N. E. winds with squalls and incessant rain with a cross sea as above; at 6 to 7 A. M. hard squalls and drizzling rain, ship pitching heavily; at 8 A. M. squalls increased, attended with constant rain and windy appearance, reduced sail. Barometer 29.78, not fallen any since

* These italics are mine, as this phenomenon is one to which too much attention cannot be paid.—H. P.

yesterday, and Sympiesometer 29.70. It continued steady from 8 A. M. to noon ; strong N. N. E. winds with squalls and much rain, a cross turbulent sea at noon. Barometer fell suddenly to 29.68. ; at 3 P. M. strong breeze from N. N. E. and rain and thick weather, wind falling light at times and freshening as suddenly again.* Made all preparations for bad weather, and brought the ship to the wind under double reefed main topsail and foretopmast staysail ; at sunset strong wind approaching to a fresh gale, with unsettled thick weather, wind lulling and freshening at times from North to N. E. with a cross, turbulent, agitated sea and constant rain. Barometer falling a little ; from 6 P. M. to midnight fresh gales and hard looking weather, no rain ; midnight Barometer 29.50 falling. Sympiesometer 29.42. Close reefed the main topsail and in forestaysail, hove to under main topsail close reefed, head E. S. E.

2nd October.—A. M. commences with strong gales, with squalls and light rain again ; sea high and cross, ship easy, and not moving much, shipping no water on deck, lurching at times. Barometer fallen at 1 to 29.30. Sympiesometer 29.22. and falling ; blowing a hard gale, pitching hard, and taking water on deck, increasing gale. Barometer falling fast ; at 3.30 increased to a violent gale, steady at about N. N. E. with a high sea from the Southward, making it very cross, shipping a good deal of water on deck when the ship lurched. Barometer fell very suddenly since midnight from 29.30 to 28.30, and Sympiesometer 28.22, and falling still. Clued up the close reefed maintopsail, and although it was run up quick, before the men could get it well fast, it blew nearly to pieces ; the wind increased suddenly to a violent storm, the drift making a clean sweep over us for several feet above the deck, the weather quarter-boat blew up to the rigging, got a rope round her to the rail. Just about 5-30 A. M. blowing a violent hurricane from about N. N. E., ship laying over three planks of her lee deck in the water ; wind most terrific, the weather quarter-boat broke the davits, blew up about ten feet up the mizen rigging, and lay across and broke the planks in several places. Stove all the full water casks that were on deck and hove them overboard to ease the ship, now laboring very heavy and burying very much to leeward ; masts bending and buckling with the force of

* This is exactly the rising and falling of the wind described in the Seventh Memoir, vol. xi, p. 1000.

the wind, ship buried to leeward as high as the rail. At 6 A. M. the fore-topgallant mast broke off above the cap, and likewise the main and mizen; put an extra batten on the after-hatch with long nails, the fore upper hatchway caulked down, the ship now laying over with her lee side all buried within two planks of the hatchway; the upper part of lee bulwark swept away and upper covering board split, the gun and carriage washed over the rail, the spars on the booms and longboat all fast; but the board on the booms adrift the wind having got under the boat, broke her lashing and blew her to pieces. Barometer still falling since 6 A. M.; at present 8 A. M. Barometer 27.92 and Sympiesometer 27.78. Blowing a terrific hurricane; ship much over, the lee side of the quarter deck quite buried, and the covering rail being apparently split, did not know the extent of the damage to leeward, it being under water; masts struggling and bending much, the foremast head gave way and fore-topmast fell over the side with yards, and our foreyard came down the foremast several feet; ship not rising at all, and wishing to wear her to get the lee side up, (hurricane still as violent,) cut away the main topmast backstays to ease the ship and try to righten her, as the fore topmast going did not appear to do so, and to save the mainmast, when the main topmast broke some feet above the cap, yards, &c. going with it over the side; still the ship lay over with most of the lee side of the deck under water, and not rising cut away the mizen shrouds to ease the ship, when the mizen mast went over the side, taking away the binnacles, compasses, boats, &c. &c. overboard, and carrying away the starboard quarter gallery, poop rail, and smashing the skylight and every thing on the poop. The ship rightened a little, broke the steering wheel and wounded a man on the poop; the sea washed into the starboard after cabin, (the Captain's,) and nearly filled it, and from it to the cuddy and other cabins, and a large quantity of water got down the companion hatch abaft the cuddy before it could be secured. Since 6h. 30m. A. M. until at present at 11 A. M., it had blown a terrific hurricane. Barometer stationary at 27.89, Sympiesometer 27.78; still blowing as furiously as ever. About a little after 11 A. M. the wind suddenly lulled very much, got the hands on the poop, got tackles on the tiller, the wheel being broken, and put it up; after some time the ship wore and cleared the deck of water, the sea knocked her about the stern in wearing,

brought her to on the starboard tack ; much lightning and dark overcast weather ; heading up N. W. At a little before noon, the wind shifted in a flash of lightning suddenly to the S. S. E. from N. N. E. and blew instantly nearly as violent as it had before done, from N. N. E. Clapped the hands on the pumps, and kept at them sometime ; but they were washed away, some rice coming with the water ; ship apparently a list to starboard ; dark overcast weather, the drift washing right over the ship ten feet above the deck ; not able to look to windward. Cut away the wreck of the mizen mast, it being now to windward, but not before it had struck the rudder and shook it very much ; it struck likewise under the counter before the ship was wore round, and shook the stern frame a good deal ; threw every thing overboard that was about the decks as well as three provision casks that had washed out from under the top gallant forecastle where they were stowed, to prevent them from wounding the people ; many having had their legs cut and other bruises. Two feet and eight inches in the well, but could not tell precisely, every thing being so wet ; set to work at the pumps, a quantity of rice coming up with the water ; pumps working well and heaving a large quantity of water ; blowing very violently from S. S. E., *the lee sea coming nearly up to the pumps at times ;** secured the foreyard and lashed the yardarm of the mainyard down to the ring bolts in the stanchion and kept it on end, to keep it steady ; tried to get something on outside the quarter gallery, as the cabins were nearly full of water, but could not succeed ; the men were washed away ; blew a violent hurricane until about 4h. 30m. P. M. black overcast weather and lightning ; when the extreme violence of the hurricane moderated a little ; all hands at the pumps, continued at them until nearly 6 P. M. when the ship sucked. A large quantity of water in the cuddy and cabins, and some of it getting below as it washed about ; succeeded in getting the quarter gallery door barricaded with canvass and battens, which kept part of the sea out. At 6 P. M. moderating to a hard gale, and glass rising slowly from 27.92 to 28.30. Sympiesometer 28.22, both rising together. Sympiesometer moved up first. Succeeded in stopping the water from getting in, got

* The italics are mine, this is partly a confirmation of my remarks on the danger of the lee sea in the First Memoir, vol. viii. Jour. As. Soc. p. 645.—H. P.

the water baled out of the cabin and cuddy, got some more of the wreck cut away, tiller loosened a little on the rudder head, got quite pitch dark, sent the men to rest in the cuddy. Barometer 28.50. Ship laying to, helm down, head E. N. E. to N. E., wind about S. S. E., cross turbulent agitated sea on, less water on deck, and violence of the storm moderating. From 9 to midnight strong gale and overcast weather, steady at S. S. E. Midnight ditto weather, ship rolling heavy at times, the Sympiesometer rose to 28.96, the Barometer got broke by striking against the side in one of the heavy rolls after the violence of the storm had subsided.

3rd October.—A. M. strong gale from S. S. E. and dark weather, but clearing away a little; ship laying to, head to Eastward, very easy and decks clear of water, great heat coming up from below. Sunrise hard gale and fair weather with passing clouds, wind S. S. E., ship laying to under bare poles, but not to the wind; clearing the wreck. Noon strong winds and fair weather. Sympiesometer 29.40. Thermometer 82°. Latitude observation 19° 46', longitude chronometer 88°. Situation by account at midnight of the 1st, when the violence of the gale commenced and lasted to 4 A. M. on the 2nd October, was latitude 18° 30' North (about) and longitude 89° 0' East. P. M. strong winds from the Southward, and cloudy weather. At 2, Sympiesometer 29.56. Thermometer 84°. Squalls at intervals and light rain, high sea on from S. E. Employed clearing wreck and getting the foreyard up, set the lee part of the mainsail, a few cloths to leeward, the rest being all blown away, to keep the ship to; the foresail nearly torn to pieces, very high sea on. Midnight strong southerly winds, passing squalls at times. Midnight ditto. Finding ourselves at so little distance from the Sandheads, and a strong southerly wind blowing and likely to continue, and not being able *yet* to keep the ship to the wind, it being S. S. E. and quite dead foul, we determined to run back, kept away N. E. by N. under clew of mainsail, going about two knots.

4th October.—A. M. strong breeze from S. S. E. to South, with passing light squalls, kept the ship N. E. by N. $\frac{1}{2}$ N. to check the westerly set that always prevails outside at this time. Noon, sea subsiding gradually, moderate breeze and fair weather. Latitude by observation 20° 12' North, longitude per chronometer 87° 58'; had a strong set about W. S. W., and shortly arrived safe at Calcutta.

Report of the Ship Emerald Isle, Capt. J. SCALES. From the Marine Board.

On the 1st instant whilst at anchor in the Eastern Channel, the weather became unsettled with the wind at East, the squalls rising about S. E., but striking us mostly from about East. About 4 p. m. gale and sea increasing, slipped and made sail to the southward. During the night it blew fresh with an increasing sea. About 5 a. m. on the 2nd, wind about E. S. E., gale increasing with such rapidity, that I was unable to shorten sail sufficiently quick, the weather beginning to assume a most wild and threatening appearance. About 1 p. m. the wind and sea had increased to that extent, and the ship so uneasy, I thought we should have been swallowed. Thermometer was then 82° and Sympiesometer $28\frac{3}{12}^*$, varying not more than a couple of tenths, until about 6 p. m., when it gradually rose, and the breeze had sensibly abated. The wind had then veered to South, but the hardest part was from the S. East; it blew hard in squalls during the night with deluges of rain, but by daylight had almost subsided. The Sympiesometer then 28.40, which at Noon rose to 28.50. Thermometer 84° , the wind then gradually drew round to the S. S. W., when the weather became clear and tranquil.

J. SCALES,

Commanding Ship Emerald Isle.

Abridged Log of H. C. Steamer Tenasserim from Singapore, bound to Calcutta, reduced to civil time.

28th September, 1842.—Noon, latitude $14^{\circ} 22' N.$ longitude $93^{\circ} 45' E.$ Narcondam at 1h. 30m. a. m. W. by N. (distance not stated). Fine westerly breeze. p. m. to midnight, winds variable, N. N. W. to W. 4 p. m. Prepara E. by N. $\frac{1}{2} N.$ (no distance).

29th September.—Fresh breezes N. W. by W. to W. N. W. No observations at noon. p. m. the same weather, Lat. account $16^{\circ} 6' N.$, longitude $92^{\circ} 15' E.$ 10 a. m. wind North. p. m. heavy squalls occasionally from N. W. Midnight wind N. W.

30th September.—a. m. strong breeze and thick cloudy weather, with a heavy cross sea, set storm stay sails. No observations. Latitude

* Captain S.'s Barometer was broken.

account $17^{\circ} 24' N.$, longitude $91^{\circ} 28' E.$ lying to. From 2 P. M. "wind shifted* to a gale from S. S. W." Hove to under storm staysails. 5h. 30 strong gale, ship labouring much and so till midnight.

1st October.—A. M. wind lulling at intervals, wind (apparently) S. S. W. till 6 A. M. when wind marked S. S. E. "At $9\frac{1}{2}$ bore away N. W. by N. with a heavy swell." Noon, latitude observation $18^{\circ} 2' N.$, longitude account $90^{\circ} 15' E.$ P. M. wind S. E. fresh breezes and rain to midnight, when by account it would appear, that she was about in latitude $19^{\circ} 33\frac{1}{2}'$, longitude $89^{\circ} 28' E.$

2nd October.—A. M. heavy squalls and rain S. E. 6-30 "fresh gale and dark rainy weather with a heavy southerly sea." 7 P. M. hove to under storm sails. At 10.15 in 70 fathoms water. Noon latitude observation $20^{\circ} 47' N.$, longitude $88^{\circ} 10' E.$ P. M. wind S. E., in 55 fathoms. Brisk gale to midnight, when fine.

3rd October.—A. M. wind S. E. 4 P. M. in 35 fathoms, and at 5 A. M. 80 fathoms, no ground (being on the Swatch). Noon, latitude $20^{\circ} 56' N.$ and squally. At 0.30 P. M. saw the Pilot.

Extract from the Log of the ship Halifax Packet, from Calcutta, bound to England. Forwarded by the Master Attendant, Point de Galle.

30th September, 1842.—At midnight the Pilot left us at the Sandheads, all possible sail set, wind N. N. E. steering S. S. E. Latitude at noon $21^{\circ} 18' N.$, longitude $88^{\circ} 40' E.$ Bar. 29.60. Ther. 82° .

1st October.—During the afternoon of this day the wind increased, double reefed the topsails, the wind veering from N. N. E. to East. Barometer and Thermometer same as yesterday.

2nd October.—At 2 A. M. civil time, the Barometer had fallen to 27.90, made all snug, the slings of the foreyard gave way, got the yard and sail secured across the forecastle, it then blowing a terrific hurricane. At 4 A. M. the bowsprit gave way, carrying away the foremast near the deck, the starboard bower anchor stock, starboard gangway rail, bulwarks, split the covering board, and stove the long

* Wind not marked, but apparently from W. N. W. when the shift took place.

boat. At $4\frac{1}{2}$ the main topmast went over the side, carrying with it the main cap and part of the mast head; cut away as much of the wreck as possible to save the rudder and ship. The crew, although strong and numerous, very inefficient. At 5, the typhoon at the highest possible state of fury, the mizen mast went over the starboard quarter, carrying with it the boom, gaff, binnacles, compasses, broke the steering wheel, and started the upper rudder brace, also a sky-light hatch, signal chest, stanchions and every thing on the poop; the ship completely under water, yet leaking but little. About noon the wind veered to South, and became more moderate. The Barometer getting rapidly up, but a high sea; the ship rolling fearfully. Barometer at noon 28.90, at 8 P. M. 29.00'. Lat. $19^{\circ} 26' N.$, long. $88^{\circ} 30' E.$

3rd October.—On the morning of this day cleared away the wreck, saw two ships dismasted and stern frame of a third, with the name in white letters, but could not read them, the sea high and the crew as much disabled as the ship; every thing full of water. Books, charts, clothes, nautical instruments and one chronometer all spoiled; wind S. S. W. Barometer at 4 A. M. 29.40, at noon 29.50.

4th October.—This day the ship rolling dreadfully, quite under water; nothing could be done but keeping her pumped out; found a great quantity of our bread in a damaged state, wind moderated from South. Barometer 29.70. Latitude $19^{\circ} 46' N.$, longitude $87^{\circ} 50' E.$

From MR. BOND, Master Attendant at Balasore, I have been favored as usual with the following able Statements of the Winds and Weather.

I have the pleasure to forward an account of the breeze here on the 1st to the 7th October 1842, up to which time the wind was variable, with cloudy weather and rain. The Barometer only fell to 29.52, thereby indicating rain more than wind, which indeed proved correct; the sea rose above high water mark, occasioned by the wind to the Southward, and three Salt Vessels were driven ashore and two Telingahs, also three Maldivé boats foundered below Chooramoon; the people of two of them having been saved in their boats, the other people were supposed to have gone ashore near Hidgelee. No other

vessels were lost north of Point Palmyras; but to the southward of the Point numbers were driven ashore and foundered, and many lives lost. A range of hills (the Neelgherries,) stretches down from the northward in a line with Chooramoon, which place lies S. S. W. of Balasore, distant twenty miles. On the N. E. side of this range of hills the winds were weak, (a top gallant breeze only,) whilst it increased on the S. W. side of Chooramoon, and onwards to Pooree and the Chilka Lake, to a complete hurricane, for the coast was strewn with wrecks, besides several ships being completely dismantled, and some having foundered.

| Oct. 1842. | Ther. 2 P. M. | Bar. 9 A. M. | Bar. 3 P. M. | Bar. 5 P. M. | Remarks. |
|---------------|------------------|-----------------|-----------------|-----------------|---|
| 1st October, | 83 | 29.80 | 29.71 | 29.67 | N. W. to N. E. rain. |
| 2nd ditto, .. | 80 | 29.71 | 29.55 | 29.50 | { Top gallant breeze N.E., squally rain. |
| 3rd ditto, .. | 82 | 29.62 | 29.65 | 29.64 | S. E. puffy rain, squally do. |
| 4th ditto, .. | 83 | 29.74 | 29.70 | 29.70 | S. E. ditto ditto. |
| 5th ditto, .. | 84 | 29.68 | 29.70 | 29.69 | S. E. ditto rain. |
| 6th ditto, .. | 85 | 29.80 | 29.68 | 29.65 | S. E. to S. W. rain slight. |
| 7th ditto, .. | 85 | 29.80 | 29.80 | 29.77 | { S.W. fairer and variable N. W. and N. E. |

The logs of the Pilot and Light Vessels will be found included in the Tabular statement. The following is the only document which I have of the state of the weather at Calcutta, which is followed by such reports from inland stations as have reached me.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of October, 1842.

| MINIMUM TEMPERATURE, OBSERVED AT SUN RISE. | | MINIMUM PRESSURE, OBSERVED AT 9 H. 50 M. | | | | | | | | |
|--|-----------------|--|-----------------|-------------|----------------------------|------------|--------------------|--------------------|--------------|----------------------------------|
| Days of the Month. | Moon's Changes. | Temperature. | | | | Wind. | Aspect of the Sky. | Aspect of the Sky. | | |
| | | Barometer. | Of the Mercury. | Of the Air. | Of an Evaporating Surface. | Direction. | | | | |
| Oct. 1 | | Inches. 29.650 | 80.5 | 78.0 | 76.0 | ° ' 76.0 | ° ' 82.0 | ° ' 82.0 | N. E. | Cirro-strati. |
| " 2 | | .620 | 79.0 | 76.2 | 76.0 | ° ' 76.0 | ° ' 76.0 | ° ' 76.0 | (high) N. E. | Raining. |
| " 3 | | .613 | 80.2 | 79.5 | 77.4 | ° ' 77.4 | ° ' 82.0 | ° ' 82.0 | S. E. | Cumuli. |
| " 4 | ● | .665 | 81.0 | 79.7 | 78.0 | ° ' 78.0 | ° ' 84.6 | ° ' 86.6 | S. | Scattered Clouds. |
| " 5 | | .661 | 81.0 | 79.9 | 78.0 | ° ' 78.0 | ° ' 84.0 | ° ' 85.0 | S. | Cumulo-strati. |
| " 6 | | .610 | 81.8 | 80.0 | 78.0 | ° ' 78.0 | ° ' 82.0 | ° ' 83.0 | S. E. | { Cloudy, Distant Thundering. |
| " 7 | | .626 | 79.6 | 78.0 | 75.0 | ° ' 75.0 | ° ' 83.4 | ° ' 85.0 | N. W. | Cirro-strati. |
| " 8 | | .670 | 80.5 | 79.7 | 77.8 | ° ' 77.8 | ° ' 83.8 | ° ' 87.5 | W. | Clear. |

| | | OBSERVATIONS MADE AT APPARENT NOON. | | | | | | MAXIMUM TEMPERATURE, OBSERVED AT 2 H. 40 M. | | | | | |
|--------------------|-----------------|-------------------------------------|-------------|----------------------------|------------|--------------|--------------------|---|-----------------|-------------|----------------------------|-----------|--------------------|
| Days of the Month. | Moon's Changes. | Temperature. | | | | Wind. | Aspect of the Sky. | Temperature. | | | | Wind. | Aspect of the Sky. |
| | | Of the Mercury. | Of the Air. | Of an Evaporating Surface. | Direction. | | | Barometer. | Of the Mercury. | Of the Air. | Of an Evaporating Surface. |  |  | Thermometer exposed to the Sun's rays. |
| Oct. 1 | | Inches 29.669 | 87.4 | 88.5 | 84.0 | E. | Cirro Cumuli. | Inches 29.618 | 87.0 | 90.0 | 83.0 | E. ... | Cirro Cumuli. |
| " 2 | | .622 | 80.0 | 77.5 | 76.0 | (high) N. E. | Raining, and fresh | .597 | 80.5 | 80.0 | 78.0 | (high) E | Nimbi. |
| " 3 | | .665 | 84.9 | 86.0 | 82.0 | S. E. | Nimbi. [gale. | .635 | 85.9 | 88.5 | 83.0 | S., | Cloudy. |
| " 4 | ● | .721 | 86.0 | 87.2 | 82.0 | S. | Cumulo-strati. | .665 | 86.1 | 87.2 | 82.0 | S., | Cloudy partially. |
| " 5 | | .669 | 85.8 | 88.0 | 83.3 | S. E. | Cumulo-strati. | .613 | 86.8 | 89.0 | 82.3 | S., | Cumulo-strati. |
| " 6 | | .610 | 82.0 | 82.2 | 79.7 | S. | Nimbi. | .581 | 83.9 | 85.3 | 81.9 | S., | Cumuli. |
| " 7 | | .693 | 85.0 | 87.7 | 80.1 | W. S. W. .. | Cumuli. | .670 | 85.2 | 88.9 | 80.9 | S. W. ... | Cumuli. |
| " 8 | | .686 | 86.0 | 90.0 | 82.7 | W. | Clear. | .650 | 86.2 | 90.0 | 82.6 | W. | Cumuli. |

The Observations after Sunset are made at the Hon'ble Company's Dispensary.

| Days of the Month. | Moon's Changes. | OBSERVATIONS MADE AT 8 P. M. | | | | OBSERVATIONS MADE AT 10 P. M. | | | |
|--------------------|-----------------|------------------------------|-------------|----------------------------|-------------------|-------------------------------|-------------|----------------------------|------------|
| | | Temperature. | | | Barometer. | Temperature. | | | Barometer. |
| | | Of the Mercury. | Of the Air. | Of an Evaporating Surface. | | Of the Mercury. | Of the Air. | Of an Evaporating Surface. | |
| Oct. 1 | | 84.75 | 85.25 | 84.25 | Inches. 29.825 | 84.36 | 85.25 | 84.25 | |
| " 2 | | 82.0 | 81.5 | 80.5 | .775 | 81.75 | 81.0 | 80.0 | |
| " 3 | | 83.25 | 84.0 | 83.75 | .886 | 83.0 | 83.1 | 81.0 | |
| " 4 | | 85.0 | 84.0 | 83.75 | .900 | 84.25 | 83.25 | 82.2 | |
| " 5 | | 85.0 | 84.25 | 84.0 | .796 | 84.25 | 84.0 | 83.25 | |
| " 6 | | 83.0 | 83.5 | 81.5 | .750 | 83.35 | 83.2 | 81.0 | |
| " 7 | | 84.25 | 84.0 | 83.5 | .900 | 84.0 | 84.0 | 83.5 | |
| " 8 | | 85.5 | 85.0 | 84.75 | .850 | 85.5 | 84.75 | 84.5 | |

The following Memorandum is from my friend WM. PEACOCK, Esq., who was, at the time of which he writes, on the river in a Boat.

Being about 10 or 12 miles above the mouth of the Bhagruttee (about latitude $32^{\circ} 32'$ N. longitude) $88^{\circ} 20'$ on the 5th October, I observed in the evening the wind was from the Eastward. gradually lulling as night came on. After sunset a very heavy bank of clouds visible all along the horizon, commencing a little East of North and running round Eastward to nearly South. During the night of the 5th, the wind sprung up again, but from the North East; and it was blowing fresh from that quarter all the forenoon of the 6th till about 12 or 1 o'clock, when heavy squalls came up from the South-East, succeeding each other at intervals of half an hour, and so on till between 3 and 4 P. M. when the weather cleared a little; but it still blew fresh from South East, with an occasional shower till evening. I was by that time in a very sheltered situation, and could not well feel the weather as I did in the morning of the 6th, and during the middle of the day, all which time I was knocking about in the open river, and exposed to the full power of the storm.

WM. PEACOCK.

The following note from Purulia, by Capt. HANNYNGTON, B. N. I. is the only trace I have of any storm in the line between Cuttack and Gya.

Purulia, 11th April, 1843.

The fact is, that we had a brisk gale here for one day during the first week of October, and pretty full memoranda of the Barometrical changes were noted down by a friend who was then here, and who instead of at once writing them in the memorandum book, committed them to a scrap of paper, which has unfortunately been mislaid. I have searched for it long and in vain. So far as my memory serves, the gale began here on the night of Sunday the 2nd October, and blew from North veering to West, in which quarter it moderated, and ceased in the afternoon of the 3rd. Seeing it was so short, and no notice being taken of it by you, I supposed that it was of no consequence, and therefore did not send a report. You will say that nothing of the

kind can want some degree of consequence, and that the memorandum should have been sent. Very true; I will behave better next time. I have much occupation, and do not keep a daily register.

Lieutenant SHERWILL, B. N. I. employed on the Revenue Survey, has kindly sent me the following Note from Gya.

We had a violent storm at this place (Gya) on the 5th October. It commenced early in the morning (sun-rise) of the 5th from the S. E. and blew with a half-gale-like strength till night-fall, when its strength increased, and it blew furiously till the morning. About 8 A. M. on the 6th, it veered round to the S. W. and blew till 12 noon, when it faded away, having lasted 30 hours, and doing some damage by blowing down trees, &c.

The storm from its commencement till close, was accompanied (with the exception of short intervals) by heavy rain; heavier than had occurred during any part or time of the rains.

No lightning or thunder during the day visible or audible; but during the night, continued peals of thunder followed in quick succession.

The whole country was flooded from the rain, tanks filled to overflowing, and in fact, the storm has proved a blessing to this part of the world.

W. S. SHERWILL.

From Pussema, near Jounpore, Lat. 25° 40' N., Long. 83° 2' E., I have from V. TREGGAR, Esq. the following account of the Storm.

I send a few notes taken during a severe storm with which we have unfortunately been visited. I hope you will be able to lay down its course by the aid of other reports, which I doubt not will be made to you. Great injury has been done to the cane crop in general, and my indigo has also suffered greatly.



Notes during the Storm of the 5th and 6th October 1842. Pussewa, 12 miles E. of Jounpore.

| Date. | Time. | Bar. | Ther. | Wind. | Remarks. |
|-------|-----------|-------|-------|-------------|--|
| 3rd. | Noon. | 29.5 | ... | E. | Fresh breeze, with occasional light showers. |
| " | 6 P. M. | ... | ... | ... | Breeze rising. |
| 4th. | Noon. | 29.4 | ... | E. | Strong breeze, with frequent showers; clouds in two strata, lower one driving very rapidly to W., upper moving very slowly in the same direction, occasional breaks showing the clear sky. |
| " | P. M. | ... | ... | ... | Heavy rain and breeze increasing. |
| 5th. | 5. 30. | ... | ... | ... | High wind and showers. |
| " | A. M. | ... | ... | E. | Ditto ditto. |
| " | Noon. | 29.25 | ... | ... | |
| " | P. M. | ... | ... | ... | |
| " | 3. | 29.1 | ... | ... | Very high wind, with rain. |
| " | 6. | ... | ... | ... | Ditto ditto, and heavy rain. |
| " | Midnight. | ... | ... | N. E. | Strong gale, with rain. |
| 6th. | A. M. | ... | ... | ... | |
| " | 3. | 29.0 | ... | N. | Gale increasing, with violent gusts, which was the character of the storm during the past night; many trees blown down, and innumerable branches torn off. |
| " | 7. | ... | 72° | N. | Violent storm, with rain. |
| " | 10. | 29.05 | ... | ... | Gale continuing, but sky clearing, a few minutes of sunshine. Barometer began to rise. |
| " | Noon. | 29.1 | 76 | N. N. W. | Gale decreasing. |
| " | P. M. | ... | ... | ... | |
| " | 1. | 29.15 | ... | N. W. | Ditto. |
| " | 2. | 29.2 | 78 | N. W. by W. | Ditto, strong breeze only. |
| " | 3. 40. | 29.25 | ... | W. N. W. | Light breeze. |
| " | 5. | ... | ... | W. | Ditto, low clouds driving very fast to S. E., heavy bank from N. W. round by N. to S. E. |
| " | 6. | ... | ... | W. | Heavy rain from N. W. |
| " | P. M. | ... | ... | ... | |
| " | 6. 30. | ... | ... | W. | Clearing up, fresh breeze. |
| " | 8. | 29.3 | 78 | ... | Cloudy, with very light rain. |
| " | A. M. | ... | ... | ... | |
| 7th | 6. | 29.4 | 80 | W. | Clear, with pleasant breeze. |

E. C. RAVENSHAW, Esq., C. S., Commissioner of Revenue for the Patna District, has obliged me with the following Notes from that Station :—

I observe there has been a heavy gale at Cuttack on the 2d instant, which extended far into the interior. As it is probably connected with a violent and continued gale experienced at this station, I enclose the very imperfect notes made by me while it lasted.

| Date. | Bar. at 10½. | Ther. | Rain. | Remarks. |
|--------|-----------------|-------|-------|---|
| Oct. 2 | Not. | 0 | 0 | } Blowing fresh from East. |
| & 3 | marked | | | |
| " 4 | 29.81 | 84 | .12 | Ditto ditto. |
| " 5 | 29.73 | 83 | — | { Ditto, at 6 P. M. rain commenced, continued pouring all night. Gale increasing. |
| " 6 | 29.51 | 81 | 4.50 | { Gale continues, trees blown down in all directions, wind shifted to the South; at 5 P. M. to the West, from which quarter until midnight it blew furiously, but with little rain. |
| " 7 | 29.74 | 79 | .12 | |
| | | | | Calm. E. C. RAVENSHAW. |

To LIEUT. CHAMIER, of the Ordnance Department, I am obliged for the following account of the Storm at Allahabad.

Possibly the following hasty Memo. of a gale of wind we had here at the beginning of the month may prove useful, as a hint to other information :—

MEMO.

October 1st and 2nd.—Strong Easterly winds and clouds, with occasional showers.

3rd.—Ditto ditto during the day, increased after sun-set, and during the night blew a gale, towards morning (4th) moderated.

4th.—Much the same as yesterday, with occasional heavy gusts and showers. At 8 P. M. increased to a strong gale, wind East and E. N. E.

5th.—Eight o'clock A. M. gale from E. and E. N. E. very strong; 11-30, moderated, heavy showers; 4 P. M. strong wind from E.; 7, moderate; at midnight increased to a strong gale.

6th.—Gale continued from E. and E. N. E. till day-break, when it decreased and commenced clearing up, the wind changing to N. E., N. and finally West, in which quarter it remained nearly steady.

Between the 1st and 6th, 1.74 inches of rain fell.



THERMOMETER.

| | | | | | |
|------------------------|------|------|------|------|----------------|
| October 1st, 10 A. M., | .... | .... | .... | .... | 86 Fahrenheit. |
| " Noon, | .... | .... | .... | .... | 21 " |
| " 4 P. M., | .... | .... | .... | .... | 93 " |
| " 2d, Not observed, | | | | | |
| " 3d, 10 A. M., | .... | .... | .... | .... | 86 " |
| " 4th, Not observed. | | | | | |
| " 5th, 10 P. M., | .... | .... | .... | .... | 80 " |
| " Noon, | .... | .... | .... | .... | 80 " |
| " 4 A. M., | .... | .... | .... | .... | 80 " |
| " 6th, 10 A. M., | .... | .... | .... | .... | 83 " |
| " Noon, | .... | .... | .... | .... | 89 " |
| " 4 P. M., | .... | .... | .... | .... | 88 " |

GEO. G. CHAMIER, 1st Lieut.
Com. of Ordnance.

The following report from Agra has been sent me by Dr. Balfour, Surgeon to the Honorable the Governor of the N. W. Provinces.

Sympiesometer and Thermometer for the first 10 days of October 1842, at Agra.

| Day of Month. | Ditto of Week. | Thermometer at 10 A. M. | Sympiesometer at 10 A. M. | Wind. | Thermometer at 4 P. M. | Sympiesometer at 4 P. M. | Wind. | Remarks. |
|---------------|----------------|-------------------------|---------------------------|-------|------------------------|--------------------------|----------|--|
| 1 | S. | 87½ | 29.13 | N. E. | 88½ | 28.94 | N. E. | |
| 2 | Sun | 88 | ·16 | vble. | 88 | 29.01 | N. E. | P. M. cloudy and slight shower. |
| 3 | M. | 87 | ·15 | E. | 85½ | ·02 | Nly. | P. M. fine shower. |
| 4 | T. | 86 | ·12 | N. E. | 86½ | 28.98 | N. Ely. | Cloudy all day, fine |
| 5 | W. | 85 | ·07 | N. E. | 82½ | ·98 | N. E. | rain in afternoon, |
| 6 | T. | 83½ | ·10 | Ely. | 85½ | ·96 | Cm. | heavy continued |
| 7 | F. | 82½ | ·15 | W. | 84½ | 29.05 | W. | rain from 10½ to 4 P. M., at times cloudy. |
| 8 | S. | 83 | ·12 | W. | 84 | ·00 | N. by E. | Shower at 8 P. M. |
| 9 | Sun | 83½ | ·11 | Cm. | 84½ | ·01 | N. E. | |
| 10 | M. | ... | ... | ... | ... | ... | ... | Absent from the station. |
| 11 | T. | 82½ | ·38 | Cm. | 84 | ·28 | W. | |

MY DEAR SIR,—The above may be interesting, as I see you have had a gale at Cuttack during the time, for which I give you a copy of my Register. Easterly winds, from my experience, are rare here in October, and rain too is unusual; the jump of the Sympiesometer on the 11th has been sustained, it never having fallen below 30 (in the morning) since.

J. BALFOUR.

I now, as in former Memoirs, give a tabular view of the Winds and Weather on different days, including in it the logs of the Pilot and Light Vessels, and shall then proceed to the concluding summary of the grounds on which I have laid down the track of the Storms.

Tabular View of the Storms of 2d and 3d October, 1842.

| Date. | Name of Places or Ships. | Winds and Weather. | Lat. N. | Long. E. | Barometer. | Simp. | Ther. | Remarks. |
|---------------------------|---------------------------------------|--|-------------------|----------|--|----------------------------------|-----------------|--|
| Noon 1st Oct. 1842. | Essex, .. | .. A. M. variable, P. M. to mid- night increasing breeze, cloudy and squally W. S. W. to N. N. E. gale at midnight. | 16.0 | 83.50 | 8, 10, Midt. | .. .. | 82 81 80* | Confused sea, dense clouds to the Northward. |
| | Lion, .. | .. W. N. W. Cloudy and 8 knot breeze. | 13.0 | 81.41 | .. .. | .. .. | .. .. | Steering to the Northward and Eastward. |
| | At Pooree, .. | .. Gale commenced at night, blowing fresh from North. | .. .. | .. .. | .. .. | .. .. | .. .. | 1st to 2d, 3 inches of rain. |
| | At Cuttack, .. | .. A. M. heavy rain. Noon N. .. N. E. and N. E. 8 P. M. increasing to fresh gale from North. .. .. | .. .. | .. .. | .. .. | .. .. | .. .. | Standing to sea to the S. S. E. 3 P. M. hove to. |
| | Eliza, .. | .. Increasing from N. N. E. with squalls. P. M. thick weather. Midnight gale commenced. | Midnight 18.30 | 89.0 | 8 A. M. Noon 3 P. M. Midnight | 29.78 29.78 29.68 29.42 | .. .. | At Anchor Eastern Channel. 4 P. M. slipped and put to sea. |
| | Emerald Isle, | .. Squally from East and in- creasing. Midnight blow- ing fresh. .. .. | .. .. | .. .. | .. .. | .. .. | .. .. |  |
| | Halifax Packet, | .. P. M. wind increasing N. N. E. to East. .. .. | .. .. | .. .. | .. .. | .. .. | .. .. |  |
| | <i>H. C. Pilot and Light Vessels.</i> | | | | | | | |
| | H. C. F. L. V. Hope, | To Noon increasing N. E., breeze & squalls, with rain, thunder and lightning. 4 P. M. blowing hard from East- ward. Sunset moderate gale East. 8 P. M. heavier, East. Midnight the same, E. N. E. | .. .. | .. .. | 8 A. M. Noon 8 P. M. | 29.65 29.61 29.52 | 82 81 82 | 30th September midnight stormy, Easterly breezes and threaten- ing weather. Bar. 29.63. Ther. 84. |

| Date. | Name of Places or Ships. | Winds and Weather. | Lat. N. | Long. E. | Barometer. | Simp. | Ther. | Remarks. |
|-------------------|--------------------------|--|---|----------|----------------|-------|-------|---|
| 1st Oct. 1842. | H. C. L. V. Beacon. | Stormy, Northerly breezes & cloudy, veering at 4 P. M. to E. and E. S. E. with hard squalls and heavy rain. 8 A. M. N. E. Noon E. N. E. to E. S. E. 4 P. M. E. S. E. to S. E. 8 P. M. S. E. to N. E. blowing hard. Midnight heavy gale at N. E. 1-30 heavy squall from E. by S. to daylight. At noon half a gale E. to E. S. E., rain and heavy sea. | 21.04 | 88.27 | .. | .. | .. | Very threatening weather and strong. <i>Westerly</i> set. 180 fms. Cable out. |
| | H. C. P. V. Saugor, | Wind from E. N. E. to East, latterly stormy, Easterly breezes and heavy squalls. | Lower Floating Light N. N. E. $\frac{1}{2}$ E. 3 $\frac{1}{2}$ miles. | | .. | .. | .. | Heavy sea making. |
| | H. C. P. V. Megna, | Light breezes N. N. E. to N. E. Middle E. N. E. to East. P. M. E. to E. by S. squally, with rain & threatening. | In 9 fms. F. L. E. by N. P. M. 14 fms. S. Channel. | | .. | .. | .. | |
| | H. C. P. V. Krishna, | Increasing gale veering S. W. to N. W. 9.30 W. P. M. moderating. Midnight W. S. W. | 11 fms. Lower Light N. N. W. | 29.59 | .. | .. | .. | Latterly threatening. |
| | H. C. P. V. Cavery, | At anchor 10 fs. F. L. N. E. by E. | | | .. | .. | .. | 3 P. M. every appearance of a gale; made due preparations. |
| Noon. | Essex, .. | | 17.10 | 85.30 | 7. 29.436 | .. | 81 | |
| 2d Oct. | | | | | 9.30. 29.406 | .. | 82 | |
| 1842. | | | | | Noon 29.406 | .. | 84 | |
| | | | | | 2 P. M. 29.436 | .. | 83 | |
| | | | | | 4. 29.836 | .. | | |
| | | | | | Midn. 29.836 | .. | | |
| | Lion, .. | Increasing breeze S. W. to W. S. W. | 15.9 | 85.21 | .. | .. | .. | Bad appearance, running to the N. E. 7 to 9 knots per hour. |

| Date. | Name of Places or Ships. | Winds and Weather. | Lat. N. | Long. E. | Barometer. | Simp. | Ther. | Remarks. |
|------------------|--------------------------|---|---------|----------|--|--|----------------------|---|
| 21 Oct. 1842. | At Pooree, .. | A. M. heavy gale in gusts from due N. 6 P. M. shifted to E. N. E. 8 heavy gale S. E. 10 S. S. E. 12 South. | .. .. | .. .. | .. .. | .. .. | 78° 76 | Thunder and lightning after shift of wind. |
| | At Cuttack, .. | Fresh gale and heavy squalls from North to N. E. Noon increasing N. & N. N. E. 4 P. M. stormy gale North, furious squall N. and N. N. E. Midnight rasping gale N. and N. N. E. .. | .. .. | .. .. | .. .. | .. .. | .. .. | Strength of the gale from Noon to Sunset of this day. |
| | Eliza, .. | Strong gales and at 3.30 violent hurricane N. N. E. 11 A. M. terrific hurricane. About Noon shifted from N. N. E. to S. S. E. 4.30 moderated a little to hard gale to midnight... .. | .. .. | .. .. | 1 A. M. 29.30 3.30. 28.30* 8. 27.92 11. 27.19 6 P. M. 28.30 Broken. | 29.22 28.22 27.78 27.78 28.22 28.95 | .. .. | Heavy sea from the Southward at 3.30. Lightning with the shift of wind. |
| | Emerald Isle, .. | 5 A. M. E. S. E. gale rapidly increasing. 6 P. M. S. abating. | .. .. | .. .. | 2 A. M. 27.90 5 A. M. Typhoon. Noon 28.90 8 P. M. 29.00 | 1 P. M. 28.3 | 82 | Hardest part from S. E. |
| | Halifax Packet, .. | 2 A. M. to Noon hurricane about N. E. ? Noon veered to South. | 19.26. | 88.30. | H. C. Pilot and Light Vessels. | | | |
| | H. C. L. V. Hope... | A. M. to daylight moderate gale E. N. E. to E. S. E. 8 A. M. to Noon East 4 P. M. S. E. Sunset S. E. by S., 8 P. M. to midnight S. E. gale and squalls, wind and rain throughout. .. .. | .. .. | .. .. | 8 A. M. 29.52 Noon 29.42 4 P. M. 29.40 8 P. M. 29.41 | .. .. .. .. .. .. .. .. | 80 82 80 82 | |

* This remarkable fall is specially noted, and confirmed by the Sympiesometer.



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| Date. | Name of Places or Ships. | Winds and Weather. | Lat. N. | Long E. | Barometer. | Simp. | Ther. | Remarks. |
|--------------------------|--|--|---|-------------------------|--------------------------|-------------------------|-------------------------|---|
| 2d Oct. 1842. | H. C. L. V. Beacon, | Heavy gale at E. N. E. to East 8 A. M. East to 4 P. M. Sunset E. S. E. 8 P. M. E. Midt. a hurricane at E. S. E. East to E. S. E., blowing half a gale throughout. .. | .. .. | .. .. | .. .. | .. .. | .. .. | Heavy squalls and sea with passing light rain a strong Westerly set, dismal weather throughout. |
| | H. C. P. V. Saugor, | E. N. E. to E. S. E. Fresh gales with hard squalls & rain. 4.30 increasing mid-die hard gales, with heavy squalls E. to E. S. E. .. Daylight blowing hard E. to E. by S. and E. S. E. .. and threatening. .. | Floating Light N. .. E. 5 miles. P. M. E. 1/4 N. 7 miles. .. .. | .. .. | .. .. | .. .. | .. .. | Tremendous sea rising and frequently breaking over the Vessel, almost sweeping the decks, 150 fms. cable. |
| | H. C. P. V. Megna, | E. N. E. to E. S. E. Fresh gales with hard squalls & rain. 4.30 increasing mid-die hard gales, with heavy squalls E. to E. S. E. .. | At anchor 20 fms. .. | .. .. | .. .. | .. .. | .. .. | Daylight driving with 110 fms. and again with two anchors 145 and 125, fms. riding very hard. |
| | H. C. P. V. Krishna, | Daylight blowing hard E. to E. by S. and E. S. E. .. and threatening. .. | At anchor 11 fms. .. as before... .. | .. .. | .. .. | .. .. | .. .. | Heavy sea throughout, riding with 200 fms. cable. |
| | H. C. P. V. Cavery, | Blowing very hard E. to E. by S. Noon E. S. E. 8 to 10 P. M. E. S. E. 10 to 12 S. E. Midnight about S. .. | Floating Light N. .. E. by E. .. .. | .. .. | .. .. | .. .. | .. .. | Heavy sea, squalls and rain throughout. |
| Noon 3d Oct. 1842. | Essex, .. Lion, .. At Pooree, .. | Fine. S. S. W. fine; heavy sea. 1 A. M. violent gusts from South abating to brisk gale P. M. S. S. W. | 19.10 17.20 1/2 | 89.25 85.21 | 29.885 .. .. .. .. | .. .. .. .. .. .. | .. .. .. .. .. .. | [Eastward. From 2d current of 90' to the Rain 8 A. M. of 2d to 8 A. M. of 3d, 5 1/10 inches. |
| | At Cuttack, .. | A. M. a lull. 6 A. M. strong breeze E. S. E. & S. E. increasing, latterly moderate. | .. .. | .. .. | .. .. | .. .. | .. .. | .. |
| | At Pooree, .. | A. M. a lull. 6 A. M. strong breeze E. S. E. and S. E. P. M. moderating. .. | .. .. | .. .. | .. .. | .. .. | .. .. | .. |
| | Eliza, .. | A. M. strong gale S. S. E. but clearing away. Noon strong winds and fair. Midnight strong Southerly winds... | 19.46 | 88.0 | .. .. | .. .. | 82 84 | 6 A. M. 29.40 2 P. M. 29.56 |

| Date. | Name of Places or Ships. | Winds and Weather. | Lat. N. | Long. E. | Bar. | Simp. | Ther. | Remarks. | |
|--------------------------|--|--|--------------------------------------|----------------|--|-------------------------|----------------|-----------------------------|--|
| Noon 3d Oct. 1842. | Ennereald Isle, .. Halifax Packet, .. | Fine, drawing to S. S. W. ... Wind S. S. W. .. .. | .. .. .. .. | .. .. .. .. | .. .. .. 29.40 | 28.50 29.50 | 84 | . | |
| | H. C. F. L. V. Hope, | <i>H. C. Pilot and Light Vessels.</i> | | | | | | | |
| | | A. M. Heavy gale E. to S. E. daylight moderate S. E. 8 A. M. blowing hard and lulls, a S. S. E. Noon S. clearing. Sunset heavy gusts South to midnight strong Southerly winds and fine heavy sea. .. .. | .. .. .. .. | .. .. .. .. | 8 A. M. 29.42 Noon 29.57 8 P. M. 29.65 | .. .. .. .. .. .. | 84 84 83 | . | |
| | H. C. F. L. V. Beacon, | Stormy gales E. S. E. to fresh gales at daylight E. S. E. to S. S. E. 8 A. M. clearing. Noon S. S. E. and fine. 4 P. M. strong S. S. E. to moderate breezes at midnight. | Station. | | | | | | |
| | H. C. P. V. Saugor, | Weather breaking. Noon S. to S. S. E. Midnight strong Southerly breezes. | Eng Lt. E b N. 6h Do. S. E. 4' | | | | | | |
| | H. C. P. V. Megna, | 4.30 Heavy gale E. to E. S. E. Daylight E. N. E. to E. S. E. 2 P. M. wind shifted to S. and S. S. W. gale much abated at 8 P. M., when fresh breezes S. to S. S. W. | | | | | | | |
| | H. C. P. V. Krishna, | Daylight strong breeze S. E., latterly S. S. E. | | | | | | | |
| | H. C. P. V. Cavery, | Midnight to 2 A. M. S. S. E. to S. S. W. to 4 A. M. S. E. Noon S. W. by S. P. M. S. S. W. | Eng Lt. N. .. E. by E. | | | | | | |
|  |  |  | .. .. | .. .. | .. .. | .. .. | .. .. | Heavy sea throughout. | |
|  |  |  | .. .. | .. .. | .. .. | .. .. | .. .. | Heavy sea and hard squalls. | |

| Name of Places or Ships. | Winds and Weather. | Lat. N. | Long. E. | Barometer. | Simp. Ther. | Remarks. |
|--------------------------------|--|---------|----------|--|-------------------------|---|
| Noon. 4th Oct. 1842. | | | | | | |
| Lion, | Squally but fine, | 20.23 | .. .. | .. .. | .. .. | Soundings 80 fms. saw a dismasted Vessel. |
| At Pooree, | Fine, with fresh S. W. breezes. | | | | | |
| At Cuttack, | A. M. increasing North, N. E. to N. E. 4 P. M. strong gale Northerly; furious squalls N. and N. E. Midnight rasping gale N. and N. N. E. | | | | | |
| Eliza, | Strong breeze S. S. E. to South, subsiding gradually. | 20.12 | 87.58 | .. .. | .. .. | Strong set W. S. W. |
| H. C. Pilot and Light Vessels. | | | | | | |
| H. C. F. L. V. Hope, | Strong Southerly and S. S. E. breezes and unsettled, latterly fine. .. .. | .. .. | .. .. | 8 A. M. 29.72 Noon 29.68 8 P. M. 29.66 | .. .. .. .. .. .. | 82 85 83 |
| H. C. F. L. V. Beacon, | | | | | | |
| H. C. P. V. Sangor,* | Southerly and hazy weather. | | | | | |
| H. C. P. V. Megna,* | S. S. E. to S. and fine. | | | | | |
| H. C. P. V. Krishna, | Pleasant breezes S. S. W. to S. | | | | | |
| H. C. P. V. Cavery, | Fine S. S. E. to South. | | | | | |

NOTE.—In replying to some Queries, Mr. Branch Pilot Ceerna, H. C. P. V. Sangor obliged me with the following; the italics are mine. The last gale was attended with few of the general signs that generally appear in these Latitudes. On the 30th of September, the weather had a fine appearance, as if the monsoon was about to set in; we had a nice N. E. breeze. 30th at night it grew cloudy and heavy rainy appearance to the Eastward and S. E.

Towards midnight these clouds assumed the most singular appearance, by which I mean, that it lightened like the flash of a gun (no report of thunder,) and then spread in thin sheet lightning along the whole horizon from about E. by N. to S. E. It had so singular an appearance in the clouds, that I remarked it to several Officers on board at the time, and the universal opinion was, that they had had weather to the Eastward; but that it would not reach us, or only in the shape of rain. On the 1st October, at 1 A. M. we had a smart squall at E. S. E. with thunder, lightning and very heavy rain. At day light the weather did not look at all suspicious. At this time there was not any set, but a long heavy swell rolling in from the S. E. as if it was blowing hard in that quarter. As the day advanced, so the wind increased in squalls, the set increased also to about three knots to the W. N. W. on the flood, and about W. S. W. on the ebb.

2d October, with the ebb the sea rose to a tremendous height, as you will see by the sufferings of the Sangor in her Log.

3d. Sea abating very little till we got to the Eastward into deeper water.

4th. All over; fine serene sky with light S. W. winds, and light showers of rain at intervals

Our Barometer was very high 29.30, to 29.28, the whole of the gale.

4th November, 1842.

In reply to some enquiries, Mr. Branch Pilot SHARLING favours me with the following Note relative to the Westerly set which prevails in these Gales.

The reason that the rate of current was left out in the logs, is, that I thought it would be of no use, but as you wish for it, the set run to W. N. W. on the flood, and on the ebb to W. S. W. from 3 to 3½ knots.

The "*Megna*" has no Barometer on board.

SUMMARY.

I now proceed to state the grounds on which I have laid down the track assigned to these Storms on the Chart.

On the 1st October.—Commencing from the Southward, we find by our tables that the *Lion** in 13° N. had nothing but a strong W. S. W. monsoon, but the *Essex* in 16° N., longitude 83° 50' E. at noon had a falling Barometer from 29.836 to 29.586 at midnight with the wind increasing to a N. N. E. gale at that time. At Pooree and Cuttack the storm commences also "at night" on the 1st, with strong breeze from the North, and the *Eliza* standing to sea, was at midnight in 18° 30' N., longitude 89° 0' E. with her gale commencing also at N. N. E.

Of these data, the *Lion's* breeze was doubtless the monsoon, and the variable squalls of the *Essex* from W. S. W. to N. N. E. at midnight, the first effects of the storms, which as the ship was only 80 miles from the high land of Vizagapatam and the ranges of hills close to and at the back of that part, were probably deflected to a N. N. E. instead of

* I take this latitude as set down, but it seems to me at least 20 miles too far to the Southward, for the *Eliza* on 30th September, at 7 p. m. had the Light Vessel bearing North, let us say at most 15 miles. She had then to midnight light baffling airs from North to South alternately, when she could not have made more than 10 miles more of Southing, or 25 miles from the Light Vessel in all. On the 1st, she had an increasing breeze of about 5 knots to 3 p. m. when she hove to, calling this 15 hours' run and at 6 knots it is but 90 miles, in all 115 miles. From 3 p. m. to midnight she was hove to, and allowing her to have made 2 miles per hour of Southing, or say 18 miles, this is but 133 miles in all, and part of it on a S. S. E. course. Now from the outer Light Vessel in lat. 21° 04' to Lat. 18° 30' there is a difference of 154 miles of latitude; while as above, we can make at the most but 133. I think this must have been an error of the copyist, but have taken it as set down, being always unwilling to assume errors in documents, unless they are evidently against common sense.

a N. N. W. gale, as the circles of them if extended to her position would require, as shewn by the arrow-line across the track of the *Essex*.

Captain McCarthy of the *Eliza* states, as before said, his gale to have "begun" at midnight from the N. N. E. in latitude *about* $18^{\circ} 30' N.$, longitude $89^{\circ} 0' E.$, its centre then must have borne about E. S. E. from him, at what distance we cannot exactly say; but I have taken it at 100 miles by projecting his subsequent drift, (as marked on the chart,) to Noon, when he had the centre of the storm passing him, and the shift of wind to S. S. E., and I have allowed also on the same grounds, that from midnight 1st October to Noon 2nd, the track of the storm was due West. This would place the centre of it at Noon on the 2d in latitude $17^{\circ} 50' N.$, longitude $88^{\circ} 40' E.$, as I have marked it; and this position being about on the meridian of the Light Vessels and Pilot station, gives them the Easterly winds and weather which they really had, being on the outskirts of a storm passing their meridian. I have also, it will be seen, marked the supposed place of the centre of this storm at midnight between the 1st and 2nd, and I need not I hope repeat here, that the whole track might have been a curve, or a succession of curves, for any thing we yet know, and that the strait lines are merely used to connect conveniently one point with another, and guide the eye.

But having thus marked the centre of the *Eliza's* hurricane at Noon on the 2nd, and we cannot well be far wrong in this, unless as before stated, there is any error in her latitude, we find that in the report from Pooree the Northerly gale which had blown there, increasing in strength from the night of the 1st, *shifted* at 6 P. M. to E. N. E., shewing that a centre of some rotatory storm had passed close to the station, or rather that the station was close to the verge of its calm space if there was one; since the gale abated in violence for about half an hour, and then blew with renewed strength, veering to the S. E. by 8 P. M., &c.

Now from the spot where we have marked the centre of the *Eliza's* hurricane to Pooree is a distance of 208 miles, and as the *Eliza* had her shift at Noon, and that of Pooree took place at 6 P. M., the interval of time is only 6 hours, during which, *if it was the same storm*, it must therefore have travelled at the rate of 39 miles an hour. This is a much higher rate than any we have yet found in the Eastern seas,

or indeed in any part of the world; the highest rate supposed being I think 24 miles per hour in the Eastern seas, which I have inferred (6th Memoir, p. 699, vol. xi. of Journal of the Asiatic Society,) may have been the rate of the *Magicienne* and *St. Paul's* hurricane in the China sea, and 30 miles per hour assigned by Mr. Redfield, as that of the Atlantic storm delineated as Track No. VIII, in his Storm chart of 1835. Both these are much below this rate of 39 miles per hour, but we have good proof here, that it did occur, for the time must be correct, and the *Eliza's* position cannot be very far wrong, as to distance from Pooree.

Assuming then this rate for the present as one tolerably well ascertained, the reader will notice, that I have marked on the chart a track parallel to the former one, which starting from the supposed place of the centre of the storm at midnight 1st to 2d October, gives another centre at Noon of the 2d, and terminates at Cuttack. This marks the supposed place of the centre of the *Halifax Packet* and *Emerald Isle's* storm, which cannot, I take it, have been the same as that of the *Eliza*.

Before going into the examination of this question, however, I would request attention to the log and track of the *Tenasserim* Steamer.

This vessel was steering up from the S. Westward, passing Cape Negrais at about 120 miles to the Westward, and we find that on the 29th, she had the winds squally and variable from W. N. W. to N. W., and even North, when in about the latitude of the Cape, and these N. W. breezes with thick cloudy weather and a heavy cross sea continued till Noon on the 30th, *as if* she was skirting the S. Western quadrant of a storm forming between her and the Coast of Arracan, a supposition strengthened by the fact, that at Kyook Phyoo, which is only 190 miles to the N. E. of her track on these days, the winds were at S. E. as they ought to be if a circular motion existed or was forming. The weather, however, which was fine at Kyook Phyoo, was not decidedly a gale with the *Tenasserim* till the 30th, so we cannot on such slender grounds say, that any vortex really was formed; but *if there was so*, and if it had remained nearly stationary for the 29th and 30th, the winds and weather experienced by this vessel were such as it would produce. Is this really an instance of the stationary formation of a storm?

About noon on the 30th, we find that the *Tenasserim* then in latitude $17^{\circ} 24'$, longitude $91^{\circ} 28'$, had had the weather severe enough from the N. Westward to be lying to from 2 A. M., and that the wind then *shifted* to a gale from the S. S. W., which kept her under storm stay sails for the rest of the 24 hours. This shift, again, is what should occur, if we suppose, as before, a vortex forming to the N. E. of her track on the preceding days, and then suddenly moving on to the W. N. W., its centre passing near to the Northward of her position, for such conditions could give exactly a shift from N. W. to S. S. W. I have marked two small circles on the charts to guide the eye in considering this supposition, which I merely make in the absence of better data to regulate our views. I need not again repeat that storms must be *somewhere* and *somehow*, and the faintest light thrown on the phenomenon of their beginnings is of importance.*

We may perhaps assume this place close to the *Tenasserim* at Noon on the 30th, to have been the centre of the nascent storm on that day, and that while the vessel was drifting to the Northward with a S. S. Westerly gale, the storm was passing slowly to the Westward. This would gradually bring the wind for her to the S. S. E. as she got upon the N. E. quadrant of the storm, and so she, in effect, had it by 6 A. M. the morning of the 1st October, when she bore away to the N. W. by N., and running always on the N. E. quadrants of the two storms, had heavy S. Easterly breezes with a heavy Southerly sea to the Sand-heads. I regret much that this vessel's log is in some respects imperfect, and above all, that though a Government Steamer, she had apparently neither Barometer nor Sympiesometer on board! for no observations of either are given. Observations of good instruments in her position would have been invaluable.

We should not forget to take into account in weighing all this, that Cape Negrais is a notorious neighbourhood for variable winds and shifting storms and gales, and that the *Tenasserim's* weather may have been mere local variations of the monsoon, and that thus the

* I have supposed here and in former papers a circular storm forming and then moving forward, i. e. remaining stationary, or nearly so, at first. We do not know if the dust-whirlwinds, so common in hot climates, and water spouts are generated by the same causes, and subject to the same laws, but both these phenomena certainly do what I have here supposed the storm (or storms) to do, that is, many of them are stationary or nearly so while forming, and then to use Bruce's words "stalk forward."

storms may have been generated 24 hours or more after she had crossed those parts of the Bay where our first circles are struck, and I have thus left the large one, which depends on the calculations derived from the *Eliza's* log, that the reader may weigh the probabilities between the two suppositions, which are, the one that between the 29th and 2nd of October, or during three days, the storm was forming and slowly moving on; and the other, that it formed and moved up as far between noon of the 1st and noon of the 2nd, as between noon of the 2nd and the time of the shift at Pooree, or at a rate approaching to such a velocity; which would then be the last supposed case of the storms having really crossed this spot twenty-four or more hours after the *Tenasserim* had done so.

We now return to the consideration of the Northernmost of the two tracks which I have laid down, or that of the *Emerald Isle* and *Halifax Packet's* storm.

The *Halifax Packet* was by her log at noon on the 30th in lat. $21^{\circ} 18'$ long. $88^{\circ} 40'$ which I have marked; but there is no datum of any sort to show where she was at noon on the 1st, and I have thus laid down her place on the 2d only, when the hurricane having dismasted her had passed on, leaving the wind at South with her at noon.

The wind is not marked during the ten hours from midnight; viz. from 2 A. M., when the Barometer had fallen to 27.90, to noon; but as it was veering from N. N. E. to a gale at East on the preceding day, we may take it to have been in its highest fury, veering from E. S. E. to S. E., and eventually to South, as it passed on; which agrees, as will be seen with her track, as her position between 2 A. M. and noon should lie a little to the S. E. of where it is at noon, as she must have been drifting to the N. West, both with the wind and with the storm wave.

The *Emerald Isle's* log describes a very rapidly approaching storm, of which, says Capt. Scales, "the squalls rose in the S. E. quarter, but struck us about East." This is an exact description of a circular storm travelling upon a track to pass to the Southward of the vessel, and perhaps, if we may use the expression, "throwing off" squalls from its periphery. By 5 A. M. on the 2d, the wind was about E. S. E., "increasing with fearful rapidity, blowing heaviest from S. E." which

in fact was the time at which he was nearest to the centre, and ending, as it should do, at South when it had passed on. At Cuttack they had by noon on the 2d an increasing gale North and N. N. E. ; by 4 P. M. strong gale North,* with furious squalls, and this continuing with little variations till 3 A. M. of the 3d, when a lull took place, followed by a change to E S. E. and S. E. The strength of the gale, says Dr. Minto, was from noon till sun-set of the 2d, while it was moderating with the ships as before remarked.

Having thus described, briefly, the weather experienced on these two tracks, it may be useful to shew by a comparative table, that they *could not* be the same storm ; for at first sight, one is inclined to take them as such, and the fact of two severe hurricanes at once, of small diameters travelling with great rapidity on nearly *parallel* lines is a new acquisition to our storm knowledge, and will serve perhaps not only in future to explain many phænomena which are not now well understood, but to guide the perplexed seaman with comparative safety, as I shall in the sequel shew. It is evident, however, that our first care is to prove, that the phænomena about which we reason did really occur. We have already shewn this, and I think with a tolerable degree of certainty ; but the negative proof will also greatly assist our views. Not forgetting my remarks on the *Eliza's* position as possibly twenty miles too far to the South, let us now see how the ships *Eliza*, *Halifax Packet*, and *Emerald Isle*, were situated during their storms ; what were the winds and weather they had ; and what were those that they *ought* to have had if they were all in the same storm ; and to the ships we will also add the winds and weather at Cuttack and Pooree, beginning from midnight between the 1st and 2nd October, which is the earliest time at which it was felt by the *Eliza*.

The *Eliza* at this time was about in latitude 18° 30', longitude 89°, and the storm had then fully begun with her from the N. N. E.

Now if all the Ships were in one storm,—

| | Should have had the wind about | But had it about |
|--|-----------------------------------|---------------------|
| The <i>Halifax Packet</i> bearing from the <i>Eliza</i> about N. N. W., distance 40 miles, | N. E. by N. • | E. S. E. |

* While it was veering to South, and at South, with the *Emerald Isle* and *Halifax Packet*, moderating from S. S. E. with the *Eliza*, and shifting at 6 P. M. at Pooree!

| | Should have had the wind about | But had it about |
|--|-----------------------------------|---------------------|
| The <i>Emerald Isle</i> bearing from the <i>Eliza</i> about N. N. W. 130 miles, | N. E. by N. | E. by S. |
| *At Pooree, distance 200 miles, E. N. E. from the <i>Eliza</i> , | N. N. E. | North. |
| *At Cuttack, distance 210 miles, N. E. by E. from the <i>Eliza</i> , | N. E. by N. | North. |

At Noon on the 2d, or 12 hours later, we find that the centre of a storm had just passed the *Eliza*, which vessel was then about in latitude $17^{\circ} 45' N.$, longitude $88^{\circ} 48' E.$ Now at this time, the *Eliza* had the wind at S. S. E. blowing a hurricane.

And the other ships, if the storm were the same, should have had the winds as follows:—

| | Should have had the wind about | But had it about |
|---|-----------------------------------|------------------------------|
| <i>Halifax Packet</i> bearing from the <i>Eliza</i> North a little Westerly, 105 miles, | Due East full hurricane. | South. hurricane abating. |
| <i>Emerald Isle</i> bearing from the <i>Eliza</i> NbW. 145 miles, | East full hurricane. | S. E. full hurricane. |
| At Pooree bearing from the <i>Eliza</i> about N. W. miles, | N. E. | North. |
| At Cuttack bearing from the <i>Eliza</i> about NWbN. miles, | NEbE. | NbE. |

These two statements will, I think, sufficiently demonstrate, that the storms were not the same; and it will be seen on examination, that the supposition of *two* storms explains all the anomalies satisfactorily.

A few words more on this subject will, however, I think dissipate any doubts. I have already remarked, page 801-802, on the rate at which the *Eliza's* storm travelled to Pooree from the undoubted station of its centre at noon of the 2nd.

Now as the shift of wind from North to E. S. E. took place, as we have seen, at Pooree at 6 P. M. of the 2nd, we should naturally look to find that, if the storms were the same, the wind at Cuttack, which is fifty miles to the North of it, veered also in such a way as to coincide with this change; or at all events, (as it was on shore,) *nearly* so. But we find on the contrary, that this did *not* take place at all; and that at

* These two stations and the ship *Emerald Isle*, may be considered as not at this time within the limits of the storm.

Cuttack it was 6 hours later, or A. M. of the 3rd that they had a lull and the wind veering subsequently from N. and N. N. E. at midnight of the 2nd, to S. E. at 6 A. M. on the 3rd.

The supposition then here is, that as 39 miles per hour is so very high a rate of travelling, this Cuttack storm, was that of the *Eliza*, of which the rate of travelling would then be reduced to 18.3 miles per hour, the distance from the place of the centre of the *Eliza's* storm on the 2nd to Cuttack being 220 miles, and the time from Noon 2nd to A. M. 3rd, say 12 hours.

But if we look at the Charts, we shall see that, had it been the case that this Cuttack storm was the same hurricane, it must have passed within a short distance of the *Emerald Isle*, (50 miles, if we have rightly estimated her position,) and still closer to the *Halifax Packet*, and that it must have been, taking it to have moved through equal spaces in equal times, nearest to the *Emerald Isle*, at about 7 P. M. of the 2nd, when she should consequently have had the hurricane in full force. This, however, is *not* the case, for by her log it is plain, that the hardest part of the gale was *over* by 6 P. M., when the wind had veered to South; whereas on our supposition, it would have been a furious hurricane at S. E., and the same, with a little variation as to time holds good for the *Halifax Packet's* storm. These vessels' logs then will not admit of our considering the Cuttack storm as the principal, or the only one, and there is moreover another obstacle to our so doing; viz. that while the Pooree storm, which in fury is described by Dr. Cumberland, who saw both, as one-eighth more violent than that of 1840,* seems, to use a familiar word, "naturally" that of the *Eliza*; that of Cuttack was but a smart gale blowing down a few trees. As to the diameters of these storms, Mr. Redfield remarks, that his storm track No. VIII, of 1835, was probably not more than 100 miles in diameter, and the Coringa hurricane of 1839 certainly contracted to about 150 miles in diameter, while it increased in fury. It will then be asked, "As what we are to consider this Cuttack storm?" I should say decidedly, that as shewn in my Seventh Memoir, it is another of those cases in which a violent hurricane coming up from seaward, with a strong monsoon blowing nearly at right angles to its track† divides

* See Third Memoir, Vol. ix p. 1021 and 1022, Journal of the Asiatic Society.

† Which we see by the logs of the *Essex* and *Lion* was the case.

into smaller storms, and no doubt the various repulsions to which a storm travelling at this high rate must have been subjected from the effects of the high land may have contributed to this effect, and that the Cuttack storm, like that of Midnapore in 1842, was a separate storm from that of Pooree, and I have thus marked it—the reader will judge if with sufficient warrant. The diminution of force may be accounted for partly, I think, by the vicinity of the Balasore Hills to Cuttack breaking up by their resistance the Northern half of it,* and partly from the interference of the two storms as they approached the land. The extreme suddenness of their approach, and severity of their effects while they lasted, sufficiently account for the dreadful losses to which I have alluded. It might also be made an additional argument for the uses of, and attention to Simplesometers and Barometers. We have no traces of these storms inland to the Southward or South Westward in the Goomsoor country, where are situated the wild tribes of Khoonds, and to the Northward and North Westward, where the country between Sumbulpore and Balasore is almost as little known.† For these parts then our knowledge ends hereabouts.

The next trace we have of any storm inland is at Purulia, and here again the question arises, if this was either the Cuttack or Pooree storms, or an independent vortex. The distance from Cuttack to Purulia is in a direct line, measured on the Post Office map 240 miles, and the bearing NbE., and from Pooree 290 miles. The change of wind took place at Pooree, as we have seen, at about 6 P. M. of the 2d, and at Cuttack about 6 A. M. on the 3d. The abatement of the Purulia storm took place also in the afternoon at Purulia, so that as far as we can ascertain from this Memorandum, we may take the centre of the storm, which if it was a rotatory one, passed to the Eastward of the station, to have been nearest the station at 10 A. M. on the 3rd. Now from 6 P. M. of the 2nd to 10 A. M. of the 3rd, is 16 hours of *time* between Pooree and Purulia, and from 6 A. M. of the

* See Mr. Bond's report from Balasore.

† The European reader unacquainted with India, will be surprised to hear this of districts only 200 and 300 miles from the metropolis of British India; but it is a fact that the very *names* of some of the Khoond tribes in Goomsoor have only become known to us since the war of 1836! and that there are still thereabouts sects and tribes of which we know indeed the names, but nothing more!

3rd to 10 A. M. of the same day, is 4 hours of *time* between Cuttack and Purulia. The first interval, of 16 hours, with the distance 290 miles, gives about 19 miles an hour for the rate of travelling; and the second interval of 4 hours with 250 miles of distance, gives 62 miles an hour! It seems then, that as far as time and distance go, taking into account the retardation which sea storms experience when they reach the land, it is *more* probable, or rather it is *quite possible*, that the Purulia gale may have been the Pooree hurricane, and that there is no possibility or probability that the Cuttack storm was so, for we know of no rate approaching to 62 miles per hour. All this is, however, but vague and unsatisfactory, but I am unwilling to leave any thing unexamined. We have seen so frequently instances of storms either forcing their way far inland, or being apparently lifted up by high lands and renewing themselves again at considerable distances, that we can only venture to state and weigh the probabilities without pronouncing dogmatically upon the connexion or non-connexion of the various storms when they appear to have some relationship. There are, however, two more circumstances to be stated, which must not be omitted, the one is that the retardation is in favour of the probability, that the storms were the same; and the other, that we may easily suppose the Pooree storm to have been turned off to the Northward by the ranges of hills behind that station. Mr. Bond's report from Balasore it will be seen distinctly points out the spur of the Balasore Neelghiris at Choramou, as the dividing line between the heavy storm at Pooree and the breeze at Balasore, Choramou being about 100 miles N. W. of Pooree and 60 N. W. of Cuttack, with the great valley of the Mahanuddee river between them; and vallies seem certainly to influence in various ways the tracks of storms.

We have next to attend to the reports from the various stations to the Northward and Westward of Purulia; viz. Gya, Patna, Pussawa and Allahabad, at which it is clear, that they had parts of, and at Patna the centre of a rotatory storm passing on the 6th and 7th. The first question which naturally occurs is again the same which we have already discussed, "*Was this the same storm as that at Pooree or a different one?*" I find it difficult to pronounce whether it was or was not, from the absence of documents by which it might be traced between Pooree and Gya. At Purulia indeed, there was cer-

tainly as we have seen a storm, and this apparently part of a rotatory one, and possibly that of Pooree, if it travelled 19 miles an hour. We have, as before said, no other intervening documents, so we are compelled to suppose either that the Pooree storm was, as clearly shewn in the case of the Calcutta storm of June,* lifted up by the ranges of hills, and did not descend again till it reached Purulia and Gya; or else it was a new storm, perhaps generated about Purulia, and travelling North and North-westerly. I have so marked it on the chart, but merely for the sake of connection, and by no means as affirming what it was; for the Purulia gale might have been quite an independent one. Beginning then at Gya, it will be found, that this place bears about N. by W. from Pooree, distance 390 miles. Now the centre of the Pooree storm passed that place at 6 p. m. of the 2nd October, and the centre of the Gya storm we may take to have passed that station at 6 a. m. on the 5th. From 6 p. m. of the 2nd to 6 a. m. of the 5th are 60 hours, which for a distance of 390 miles, gives 6.5 miles an hour, while the rate of the Pooree storm we find to have been 36 miles per hour at sea, and 19 miles on shore, which is a second retardation of rate so far beyond what we have hitherto seen, that it is much in favour of its being an independent storm. The track from Pooree to Gya it may be remarked, is however, analogous to those of the Calcutta storms of June 1842. Leaving out the strong S. Easterly breeze experienced by Mr. Peacock on the Bhagiretty, as, at most, a distant effect of some of these storms, we may commence on the 5th October, where we find that

| | |
|---|---|
| At Gya, there was, | { From 6 a. m. gale from S. E., furious at midnight, and lasting till 8 a. m. on the 6th. |
| At Patna, | { Falling Barometer, rain and increasing gale from the East till midnight. |
| At Pussewa, latitude $25^{\circ} 41'$, longitude $83^{\circ} 03'$ distant about $168'$ N. W. by W. of Gya, | { Barometer sunk 0.25 from the 3rd instant. p. m. high wind East and N. E. increasing to gale, with violent gusts at North by daylight of 6th. |
| At Allahabad, latitude $25^{\circ} 27'$, longitude $81^{\circ} 50'$ E., .. | { By 8 p. m. on 4th, strong gusts and showers had increased to a gale East and E. N. E. At 8 a. m. 5th very strong, moderating and increasing again at midnight to a strong gale. |

* See Seventh Memoir, Jour. As. Soc. Vol. xi, p. 1089.

Agra, } Unusual winds from the Eastward
and Simplesometer falling.

ON THE 6TH OCTOBER.

At Gya, } At 3 A. M. S. E. gale *veering** to
S. W. and blowing till noon, when it
moderated.

At Patna, ... } From midnight furious gale, blowing
down trees. Noon Barometer had fallen
from 29.81 on the 4th to 29.51, wind
shifted to South, time not marked. At
5 P. M. to the West, blowing furiously
till midnight.

At Pussewa, } Gale from North, violent gusts to
Noon, when N. N. W. and Barometer
beginning to rise, veering to N. W. and
finally to West; but only a strong
breeze by 3 P. M.

At Allahabad, } Gale continuing from East and E.
N. E. till daylight, when moderating
and veering to N. E. North, and
finally West.

Allowing for the numerous disturbing causes which inland storms meet with, and for the general nature of the observations, it will be found that the circles I have marked on the chart shew the variations which are described in the winds as the storm travelled up to the North and by East, (the first instance of a storm track, trending to the *East* of the meridian,) from the neighbourhood of Gya, and passing not far from Patna and between it and Pussewa; though it might perhaps have been better placed about half way between both? But the word "shift," used in Mr. Ravenshaw's report from Patna, inclines me to believe, that the change was, if not a sudden, a very rapid one, whereas that at Pussewa was evidently a *veering* from North at 7 A. M. to N. N. W. at Noon, and N. W. at 1 P. M. or 4 points in 6 hours. Beyond Patna we have no farther trace of the storm.

I should thus be inclined to take this storm as quite a separate one. I have already remarked on and discussed the rates of travelling of the various storms, and no farther observations occur to me, except to remark on the very high rates of travelling, which the *Eliza's* log and

* "Veering" and not "shifting;" and the careful use of these words is important; for the *sudden* shift, particularly with an interval of calm, indicates the passage of the central portion of a gale; the "veering" that it has passed *near* the spot.

Pooree report furnish us, which are as yet new in the Eastern Seas, and the remarkable confirmation of the fact of the dangerous Westerly set of 3 or 4 miles per hour prevailing at the Sand Heads, even when as in this case, the nearest centre of the nearest storm was at least 100 miles distant from the Light Vessels!

P.S.—I obtain, just as this sheet goes to press, two more documents. The abstract of the log of the Ship *Seringapatam*, Capt. Robertson, and the notes taken at Purulia, which Capt. Hannington had mislaid. The memorandum from the *Seringapatam* is as follows; she was bound to Madras:—

1st October, 1842.—Nautical Time.

| | | | |
|---------------------|-----------------------|-------|-------|
| Course and Distance | Lat. and Long. Noon | Bar. | Ther. |
| S. S. W. | 19° 26' N. 86° 36' E. | 29.60 | 83° |

Wind and weather variable S. W., N. W., and S. E., with thunder and rain.

2nd Oct.—S. S. W. 180. | 17° 39' 84° 32' | 29.50 83°

N. W. strong breeze throughout.

This position it will be seen places the *Seringapatam* on nearly the same meridian as the *Essex*, but about 30 miles further to the Northward at Noon on the 2nd, and about 15 miles nearer to the track of the centre of the Pooree hurricane, as I have laid it down. Her Barometer is accordingly lower, and she had the N. W. breeze, (it would have been a *gale* had she been a degree less advanced on her track,) “a steady” one throughout, which is what *ought* to have occurred with her.

The following is the tabular statement of the storm at Purulia, as sent me by Capt. Hannington:—

1843.]

Ninth Memoir on the Law of Storms in India.

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*Meteorological Register kept at Purulia, during the Storm of the 2nd and 3rd of October, 1843, by Captain G. C. ARMSTRONG,
49th Native Infantry.*

| Date. | Hour. | Barometer at Purulia. | Barometer reduced to the level of Calcutta. | Thermometer. | | Direction of wind. | REMARKS. |
|------------------|----------|--------------------------|---|--------------|-----------|--------------------|--|
| | | | | Attached. | Detached. | | |
| 2nd October, | 8 P. M. | 28.94 | 29.62 | 80½ | 78 | E. | Strong breeze, increasing. Scud low, and driving fast. |
| Ditto, | 10 P. M. | " | " | " | " | E. b. S. | Gusty, with alternate lulls. |
| Ditto, | 11 P. M. | 28.90 | 29.58 | " | " | " | Fresh gale, a little rain. |
| 3rd October, | 2 A. M. | " | " | " | " | " | Ditto, more continuous, with occasional violent gusts. |
| Ditto, | 5 A. M. | 28.92 | 29.60 | 80 | 77 | E. S. E. | Ditto, moderating a little, heavy rain since 3 A. M. |
| Ditto, | 8 A. M. | 28.94 | 29.62 | " | " | E. | Fresh breeze, clearing up and moderating. |
| Ditto, | 10 A. M. | 28.96 | 29.64 | 80 | 77½ | " | Breeze, moderating and abating. |
| Ditto, | Noon. | " | " | " | " | " | Light airs, heavy rain with lightning and thunder. |

J. HANNYNGTON, *Principal Assistant.*

Maubhoom Division, Principal Assistant's Office, Purulia, the 11th November, 1842.

This document shews that, as I have supposed at p. 810, the Purulia storm, if it was any part of a circular one, was doubtless an independent one, both as regards those to the Southward and to the N. W. of that station, the little change indicating that it was, if circular, passing on nearly an East and West track to the South of Purulia.

H. P.

Notes on a curious species of Tiger or Jaguar, killed near the Snowy Range, north of Darjeeling. By Lieut. TICKELL, Bengal Native Infantry, Assistant Agent to the Governor General, S. W. Frontier.

The animal from which these notes are taken was killed by a Bho-tia, near the Snowy Range, in the northerly part of Sikkim, and its skin subsequently purchased by a gentleman who obligingly lent it to me for the purpose of sketching. The want of a better model to copy from, has probably rendered my drawing, with regard to outline, faulty in many points. But careful measurements, protracted on a scale, may give a tolerable approximation to true proportions and general aspect, and the markings of the skin are faithfully delineated, as well as the color of the fur carefully described.

Dimensions of the Skin.

| | | | Feet. | Inches. |
|--|-----|----|-------|---------|
| From nose to root of tail, | .. | .. | 3 | 5 |
| Tail, | .. | .. | 2 | 10½ |
| Centre of back, between the shoulders to | | | | |
| sole of fore-paw, | ... | .. | 2 | 0½ |
| From root of tail to sole of hind paw, | .. | .. | 2 | 1¾ |
| „ nose to eye, | .. | .. | 0 | 4½ |
| „ eye to ear, | .. | .. | 0 | 5½ |
| „ ear to between shoulders, | .. | .. | 0 | 8 |

Of the breadths of various parts I take no measure, for they are in places shrunk, and in others pulled out during the operation of flaying. The head is narrow and nose somewhat elongated, the muzzle approaching the attenuated form in some of the smaller cats, leading into "Viverrina." Limbs and body bulky and low, and the tail very thick, long and furry. The hair on other parts is thick and soft, but shorter

than in the Leopard. Claws powerful. Lips, brows, and cheeks near the corners of the mouth, furnished with whitish vibrissæ.

Color.—Pale bistre brown, (a plain dullish clay brown,) fading on lower parts inside the limbs, and on cheeks and lips to pale rufous tawny. Centre of head covered with small longitudinal black spots, a few also about supercilium. Inferiorly and posteally to eye, two narrow stripes reaching to molar angle, and produced, with broken intervals, by other broader stripes along the side and front of neck. A black band across throat, bases of ears black. From behind ears, all along mesial line of back, a double line of chain-like stripes, more or less interrupted and more or less parallel. On the nuchal region these diverge and afford room to an inner, smaller, similar chain. From each side these chains diverge three large ovate spaces, encircled by broken lines and patches, well defined posteally, almost obsolete anteally. The loins and flanks of the belly, instead of these large patches, have similar but smaller and more numerous ones; some nearly circular, all packed together so as to leave narrow intervals between them. On the limbs the markings are more irregular, consisting of zig-zag longitudinal patches, decreasing to spots on the carpal region. Paws (as nose) plain dull brown. Tail brown, thickly furred and marked black. Its end plain brown. The large oval spaces and the smaller ones of the after-parts of the sides do not reach to the belly, which is marked with large irregular patches and lines. These marks are all, above and below, black. And the areas of the large encircled spaces, as also of the smaller ones, above-mentioned, are shaded with a darker tinge of brown, and the former are therein studded with black spots, which give the fur a rich and beautiful appearance.

Although I have not so named it above, I have little doubt that this animal is the same as the *Felis Macrocelis* of Temminck, known at Sumatra by the name of Rimau-dihan, or 'Tree Tiger', and minutely described in Jardine's *Naturalist's Library* in the volume on *Felinæ*. The ground-color of the body is there said to be greyish, not the slightest tinge of which is perceptible in the skin before me. The size of the present subject is also superior, its total length being six feet and three and a half inches. In all other respects the description exactly coincides. The bulky limbs, stout body and powerful retractile claws of the animal do not seem to accord well with Sir Stamford Raffles' description

of its innocuous habits, of its feeding almost entirely on birds, (caught in trees!) and on the poultry of the villagers, and of its becoming readily and permanently tame after capture.

The Lepchas here call the animal "Pungmar," and the Bhotias "Zik;" their accounts are widely different to the above. They describe it as an uncommonly fierce and wary animal, difficult to approach, and dangerous to attack, from its invariably turning on the assailant if wounded. It is a rarer animal than the "Sejjiak" or Leopard; but it is to be found in the yallies lying north of Darjeeling, in dense jungle, chiefly by the banks of rivers; the Ranget, Roongnoo, &c. affecting low places in preference to mountain tops. It approaches the villages of the Bhotias and Lepchas sometimes, and kills goats, pigs, &c.; of its predilection for poultry, nothing is said by them; and of its propensity to climb trees, I could gather nothing satisfactory. The Lepchas affirm that it has been seen on trees, but that it ascends them *in play*, and not to seek food. Indeed the notion of such a large animal catching birds on trees, appears ridiculous. Altogether the accounts as received by me, of the "Pungmar" tally more with the description (as to disposition) of *Felis Nebulosus*, the "Rimau Maug" of the Sumatrans, as cursorily given in the work above referred to.

M. Stanislas Julien on the Study of the Chinese Language. Translated for the Journal of the Asiatic Society. By HENRY PIDDINGTON, Sub-Secretary, Asiatic Society.

The Asiatic Society has just received from its author M. Stanislas Julien, a work entitled "*Exercices Pratiques d'Analyse de Syntax et de Lexigraphie Chinoise*," of which the subject is a critical examination of thirteen lines of a translation of a notice in the work of the Chinese traveller and author Hionen-tsang upon India, by M. Pauthier.

In this translation, M. Stanislas Julien detects ninety-four faults in thirteen lines! and his criticism is approved by the first Chinese scholars of England, Germany and Russia. His work is dedicated to his friend, Mr. Morrison. With this controversy we have nothing further to do than that it may serve to put us a little on our guard as to what some Chinese translations *may* be;* but the introduction to M. Julien's paper is so remarkable, as containing the opinions of a first rate Chinese scholar and a

* As for instance, some which were copied from the Canton Register into the Calcutta papers about a year or more ago, in which, in a single proclamation, half a dozen common English, and I believe some Latin quotations were inserted, and this we were gravely told, was a translation from a Chinese State Paper.—H. P.



man of letters, highly distinguished in other walks, on the study of the Chinese language, that I have thought it well worth translation; since at the present time, nothing which can encourage or facilitate the study of this language is indifferent to us, independent of its high interest in a mere philological point of view. This introduction I find, also appeared with his first controversial paper in the *Journal Asiatique*, for May 1841, but it is reprinted with the present pamphlet.

“The time is now happily far distant since it was generally believed in Europe, that the study of the Chinese language required, even in China, the whole life of a man of letters. M. Remusat has greatly contributed by his works and his teaching to destroy this prejudice, and if some men of learning yet give credit to it, it is because they have not taken the trouble to examine the question. This opinion would indeed be well-founded, if to speak, read, and write Chinese it were necessary to learn the forty-two thousand characters, which compose the great Dictionary, published in thirty-two octavo volumes by the emperor Khang-hi; for certainly not a single Chinese man of letters would be found capable of such a prodigious effort of memory. But it is as useless for a Chinese, or a European to know, and to be able to write all the characters of the *Khang-hi-toen-tien*, (Khang-hi's Dictionary,) as for a foreigner studying our language to be acquainted with all the words of the French Dictionary of Boiste, which in mere words is three times as rich. Supposing that the most complete of our Dictionaries contains, as is said, a hundred and twenty-four thousand words, we may say without fear of contradiction, that a foreigner who knows only three or four thousand, would be able to read the majority of French authors. More than a hundred thousand words, or terms, are relative to sciences, arts and trades, and which seldom occur in literary works. When the reader meets with them, he looks for them in a good Dictionary, and continues his reading without fancying that he does not understand French because he is unacquainted with some choice scientific or technological terms.

The case is exactly the same with the Chinese Dictionaries. The Emperor Khang-hi's would be reduced from forty-two thousand to six or eight thousand words,* if we were to subtract from it about ten thousand variations of ancient and obsolete characters, of names of men, of places, of mountains, and of rivers, and of the terms belonging to sciences and art.†

* Several with no meaning, Marshman's Introductory Remarks, p. 31.

† 1900 characters form the materials of the language, Marshman, p. 37.



Under the *Han* dynasty, says the author of the Vocabulary of the *Kings*, candidates for the offices of historians of the empire were required to know at least nine thousand different characters. Now, as the complete annals of any epoch must comprise, in methodical order, almost every subject of literature and science, it would appear from this alone, that the number of characters which the most learned men were required to know, differs prodigiously from that which many persons in Europe suppose necessary for the lowest literary grades.

We may indeed suppose, that these last hardly require more than five or six thousand words to speak, read, and write Chinese. In fact, the four classic books do not contain more than two thousand and four hundred characters; but nevertheless, a person who has carefully studied them, and who is at the same time master of the principles of Chinese syntax (*construction*,) can understand without assistance almost all books of history, geography, and philosophy. In China the candidates for the literary rank of Kiu-jin, (Licentiate,) are only required to have well studied the four classic books, and any one of the *Kings* (canonical books,) which they may choose.

From what has been said, the study of the Chinese language does not require, as far as relates to the necessary words, more trouble than any foreign language; such as German for instance, which is commenced without any fear, and with a certainty of mastering it.* But the difficulty in the study of Chinese does not consist in the number of words. It is well known, that this language is a monosyllabic one, and that its words do not allow of inflexions indicating in substantives and adjectives genders, numbers and cases, and in verbs, times and persons. Moreover, the same word sometimes changes its value in changing its place, and becomes a substantive and adjective; a passive active, or neuter verb or adverb. The word *chew* for example, may signify good (substantive,) good (adjective,) esteem good (approve,) and good adverbially taken; when the mechanism of the Chinese language is understood this word is as explicit in its different positions as the Latin words *bonum, bonus, bonum judicare, bené*.

The English language has some similarity to this. Certain substantives by their position, and by the words which accompany them, become sometimes adjectives, verbs, and adverbs, without the

* See also Marshman's Introductory Remarks, p. 3.

least difficulty arising therefrom to the reader or hearer. Thus the word *cut*, is an adjective in "a *cut* wig," and a verb in "to *cut* timber."

The word *present* (a gift) is an adjective in "the *present* season," and a verb in "to *present* a man."*

The word *head* is an adjective in "the *head* workman," and a verb in "to *head* the people."

In Chinese, the word *cheou* (head,) may become, according to circumstances, adjective or verb, or an adverb.† The English word "*pen*" is a verb in "to *pen*," (write,) a letter.

The Chinese word *pi* (pencil) has the same scope; it may signify, according to its position, "*pencil*," and "to write with a pencil."

It follows then, that to understand Chinese, it is not sufficient to be acquainted with a great number of words. Although the nine thousand words formerly required to become one of the historians of the empire should be perfectly known by heart, this alone would not suffice to understand half a page of the easiest Chinese text.

To be able to give to each word the value resulting from its position, and to catch the varying sense of the prepositions and particles,‡ which determine the reciprocal relation of words, the language must be studied systematically; the student must have analysed, and I might say *dissected*, philosophically, the best translated works by the Missionaries, or by the learned of Europe, who have taken them for guides. He will then be able to distinguish with certainty, the positional values (*valeurs de position*,) upon which the knowledge of the Chinese language mostly depends. In this respect its difficulties are of a peculiar kind; but not greater nor more numerous than those of other languages of the East or of Asia. We have seen many persons, who after some years of study and application, have been able to read, translate or analyse with all desirable exactitude, ancient or modern Chinese works relating to their studies. I may name M. Bazin, senior, who has given to the learned world a first volume of Chinese Dramas, completely translated in prose and verse, and who is now about to publish the complete translation of a celebrated Drama in twenty-

* Our English readers will observe, that M. Julien has here forgotten the pronunciation which makes a different word of it. He probably alludes here to the mere spelling, which to the eye of a Chinese, as to that of a child, makes it the same word as the substantive.

† Examples from Marshman, p. 195.

‡ Marshman alludes to prepositive characters to mark the cases of nouns, and again, p. 994, "every termination is supplied by position."



four acts.* M. Theodore Pavie, who had studied Sanscrit and Chinese at the same time, acquired in a few years a remarkable knowledge of these two languages, and to him we owe a volume of Chinese Novels, not less distinguished by the elegance of their style, than by the fidelity of the translation; and M. Biot, junior, whose early studies and a solid knowledge of the Chinese language, have enabled him to examine, with much advantage to science, books written in the ancient dialect, and relative to the history, geography, statistics, or arts of China. The readers of the *Journal Asiatique* have often had occasion to appreciate the Memoirs with which he has enriched its pages. He is now preparing for the press the Alphabetic Concordance of the names of Chinese towns of the first, second, and third rank, which have been changed under different dynasties. This will reflect new honour on the author, and new light upon our knowledge. I might add to these names, those of M. Leon Pages, Advocate, who has just concluded a French translation of the four classic books (*Kings*) with a running commentary, and of his cousin, M. Edmé Mechain, (grandson of the astronomer,) lost to science by an early death when Vice-Consul at Smyrna. M. Mechain had learnt Chinese when a law student, and only at his leisure hours, and yet in three years he was able to read with facility. Son of a Consul General, and pursuing that profession, he hoped to become one day French Consul in China, and that his knowledge of the languages of the celestial empire might be of use to our commerce, our arts, and our literature. His name as a Chinese scholar would be still unknown, were it not that I have felt it a duty to mention here his zeal and his remarkable acquirements in Chinese.

It is thus a well established fact, both from the examples which I have quoted, and from a sort of public notoriety, that in a few years a tolerable knowledge of Chinese may be acquired. But there is *one indispensable condition*, which is to study with care the laws of construction, the fixed principles which determine the grammatical functions of the words and modify their value according to the place in which they stand in the sentence; the value of the prepositions which are sometimes significative as in other languages, and sometimes lose their usual meanings, becoming purely phonetic marks of regimen,

* This Drama, entitled "*Pi-Pa-ki*, or the History of the Lute," was published in 1841, by Dupont.

as have I believe demonstrated in the dissertation at the close of my Sinico-Latin edition of the works of the Chinese philosopher *Meng-tseu*. If these rules, which are for Sinologists what those of inflexion are in other languages, and which are their best guides in interpreting a passage, be neglected, the Chinese language may be studied for many years without ever acquiring the degree of knowledge necessary to become a faithful translator."

Proceedings of the Asiatic Society.

(Monday Evening, the 4th September, 1843.)

The regular monthly meeting of the Society was held at the rooms on Monday the 4th September, at the usual hour. The Honorable the President in the chair.

The following Members proposed at the August meeting were ballotted for, and declared duly elected. The usual communication was ordered to be made to them :—

Major W. Anderson, B. H. A.; F. Mouat, Esq. M. D., B. M. S.; and Capt. Stephen, B. N. I., A. D. C. to the Honorable the Deputy Governor.

And the following new Member was proposed :—

Dr. Sprenger, B. M. S. proposed by the Honorable Sir H. Seton, seconded by Mr. H. Piddington.

The following list of Books, presented and purchased, was read :—

Books received for the Meeting of the Asiatic Society, on the 4th September, 1843.

The Oriental Christian Spectator, second series. Bombay, August 1843, vol. iv, No. 8.—Presented by the Editor.

Journal of the Bombay Branch of the Royal Asiatic Society. Bombay, April 1843, No. 5.—Presented by the Society.

Journal Asiatique, 3me série, tome vix. Juillet à October 1842. Nos, 76 à 78, Paris.—Presented by the Society.

Jamieson's Edinburgh New Philosophical Journal, Edinburgh, 1843, vol. xxiv, No. 67.—Presented by the Author.

Proceedings of the Geological Society of London, 1842, vol. iii, part ii, No. 91.—Presented by the Society.

Proceedings of the Academy of Natural Sciences of Philadelphia, for August, September and October 1842, Nos. 17, 18, and 19.—From the Academy, (two copies.)

London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, third series, London, January 1843, vol. xxii. Nos. 141 and 142.

Transactions of the Royal Astronomical Society, London, 1842-43, vols. xii, xiii, and xiv.—From the Astronomical Society.

Early Records in Equity. Calcutta, 1842.—Presented by the Hon'ble Sir H. W. Seton.

Calendars of the Proceedings in Chancery in the reign of Queen Elizabeth.—Presented by the Hon'ble Sir H. W. Seton.

Bulletin de la Société de Géographie, 2me série, Paris 1842, tome xvii.

Naturalist's Library.—Ornithology, vol. xiv, Nectariniadae, or Sun-Birds. Edinburgh, 1843.—From the Booksellers.

Pauthier, Réponse a l'Examen Critique, Paris, 1842.—Presented by the Author.

Pauthier, Examen Méthodique des faits qui concernent Le Thian-Tchu ou L'Inde, Paris, 1840.—Presented by the Author.

Pauthier, Vindictæ Sinicæ. Dernier Réponse à M. S. Julien, Paris 1842.—Presented by the Author.

Bopp, Vergleichende Grammatik des Sanskrit, Zend, Griechischen, &c. &c. Berlin, 1842, Vierte Abtheilung.—Presented by the Author.

The Secretary read the following Memoranda :—

1. It has been suggested by several Members, and the Secretary begs now to mention it, that the works of reference belonging to the Library of Fort William, which as a temporary arrangement were made over to the Public Library, might more appropriately be deposited in that of the Society, and this with more advantage to the public in general.

2. Government having requested a further supply of fifty copies of the Scinde Vocabulary, these have been sent from the copies placed for sale with the Booksellers. The copies for sale at Bombay have been sent to Messrs. Collett and Co.

3. It has been suggested to Government, that at the present time a reprint of Lieut. Leech's Grammar and Praxis, &c. of the Brahoee, Beloochee and Punjabee languages, which forms about 61 pp. of the 7th vol. of the Journal would be most useful with reference to our new acquisitions in the West of India. In consequence of this, a reprint has been sanctioned, and is now in progress at Bishop's College Press.

With reference to the first of these Memoranda, it was ordered, that the Secretary be requested to inquire into and state to the Committee of Papers, what were the conditions under which the works in question were deposited in the Public Library, and to frame thereupon an application for them in terms of his suggestion.

The Secretary farther reminded the Society, that two works from Messrs. Ostell, *i. e.* Cuvier's Mammiferes, and Swainson's Illustrations, had remained for inspection, and that some Nos. of Smith's Zoology of Southern Africa had also been sent for inspection by a private individual, who was desirous of disposing of them. Some conversation took place, when it was agreed upon, that the purchase of Cuvier should be farther considered, with reference to the possibility of obtaining a copy cheaper from Europe. The Honorable the President begged to be allowed to present to the Society, Swainson's Illustrations, and Dr. Smith's Zoology of Southern Africa in testimony of his high appreciation of the indefatigable labours of Mr. Blyth



in the Zoological Department, and his desire to assist and forward them. The best thanks of the Society were voted for this very liberal donation.

The following note from the Librarian, addressed to the Secretary, was read :—

To H. TORRENS, Esq. Secretary, Asiatic Society.

SIR,—I have the honour to forward to you the enclosed note of Mr. J. Thomason's, who desires me to bring to your notice, that some papers, published by the Royal Asiatic Society and the Bombay Branch Society are not in our Library.*

The papers alluded to, are contained in the Transactions of the R. A. S. and the Journal of the B. B. S., and with regard to these publications I beg to state, that we have received only the first three volumes of the Transactions of the R. A. S.,* and there are only a few numbers of the above-mentioned Journal in our Library.

As these publications are most intimately connected with the progress of Oriental learning, I beg leave to propose, that they should be procured for the Library.

23rd August, 1843.

Your most obedient servant,

E. ROER.

It was ordered, that the works alluded to be completed for the Library.

Read the following letter, accompanying a valuable donation of rare Books by the Honorable Sir H. Seton, for which the thanks of the Society were voted :—

To the Secretary of the Asiatic Society.

SIR,—As it appears by the Catalogue lately published, that the Library of the Society, among the works published by the Record Commission, does not contain the Calendars of the Proceedings in Chancery in the Reign of Elizabeth, I beg to present it with a copy of them, together with an unpublished Tract relating to their contents.

I have the honor to be, &c.

Calcutta, 24th August, 1843.

H. W. SETON.

Read the following letter from the Under-Secretary to the Government of Bengal, sanctioning an allowance of Co's. Rupees 64 per mensem, for the expenses of the Museum of Economic Geology :—

No. 842.

From Under-Secretary to the Government of Bengal to H. TORRENS, Esq. Vice-President and Secretary, Asiatic Society.

SIR,—With reference to the second paragraph of my letter, No. 621, of the 3rd instant, I am directed to inform you, that the Honorable the Deputy Governor of Bengal, with the concurrence of the Government of India, is pleased to sanction the monthly sum of Co's. Rs. 64, for establishment and contingencies of the Museum of Economic Geology.

I have the honor to be, Sir,

Your most obedient servant,

Fort William, 31st July 1843.

A. TURNELL,

Under-Secretary to the Government of Bengal.

* The Transactions of the R. A. S. are now published in the form of a Journal, which the Library possesses.



Read the following extract of a letter from Dr. Wise, B. M. S. to the Sub-Secretary, dated Dundee, 29th June, 1843.

I was hurried across Egypt in such a manner as prevented me from delivering the box of Books in person to Mohammud Alee, which the Asiatic Society, at your kind suggestion, charged me with. I sent it to the palace of Grand Cairo, and requested the British Consul and Clot Bey to see that it was delivered in a suitable manner. This I am sure they did, and to my great regret it was all I could do, as the Padsha was in Upper Egypt when I was at Cairo. After all the preparations I had made, the steam boat was not able to land our party at Cosseir on account of the weather, and I therefore came to England with the same mail I had come from India with.

Read letter from M. Delessert, returning thanks for the honor conferred on him by his election at the August meeting.

Read the following letter from Messrs. W. and H. Allen, the Society's Booksellers and Agents in London :—

HENRY PIDDINGTON, Esq.

SIR,—We have the pleasure to send you, as Secretary to the Asiatic Society, our account to this date. We enclose the particulars of £43: 16: 4, against the Society for money paid, and books supplied by us. The account current annexed herewith gives credit for the publications of the Society sold during the year, which leaves a balance of £13: 18: 3, due to us.

We have hitherto been instructed to keep the account for the sales of the Journal separately, and the enclosed statement for the sales amounts to £32: 12: 0. The two accounts shewn, together, leave a balance of £18: 18: 9 in favor of the Society, and we leave you to determine the mode of settlement. We shall be most happy to honor your draft at 30 days' sight for either of the balances. If you draw for £32: 17: 0, then the Society will be indebted to us the balance of the account current.

We have the honor to be, Sir,

Your most obedient servants,

W. H. ALLEN and Co.

London, 30th June, 1843.

Dr. *The Asiatic Society Calcutta, in Account with William H. Allen and Co.* Cr.

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London, 30th June, 1843.

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1843.]

Asiatic Society.

825

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| | Shipping Expences, &c. | ... | | | | | |
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| | Leach's Zoological Miscellany, colored, 3 vols. Royal 8vo. cloth, lettered, | ... | 4 | 13 | 0 | | |
| | G. R. Gray's List of the Genera of Birds with their Synonymes, 2nd Edition, 8vo. cloth, | ... | 0 | 9 | 0 | | |
| | Bibliothèque de M. Silvestre de Sacy, liv. 1, 8vo. stitched, and de Delhi à Bombay, par Roberts, and paid Duty on ditto, | ... | 0 | 2 | 6 | | |
| | Journal Asiatique, January and February, and paid Duty on ditto, | ... | 0 | 1 | 0 | | |
| | Transactions of the Geological Society, vol. 6, part 7, 4to. stitched, | ... | 0 | 0 | 0 | | |
| | Journal des Savants, February and March, | ... | 0 | 0 | 0 | | |
| | Report of the British Association for 1842, 8vo. bound, | ... | 0 | 0 | 0 | | |
| | Edinburgh Philosophical Journal, No. 68, | ... | 0 | 0 | 0 | | |
| | Philosophical Magazine, April and May, | ... | 0 | 0 | 0 | | |
| | Two Royal 8vo. Packets from the London Electrical Society, | ... | 0 | 0 | 0 | | |
| | Saadi, par Garcin de Tassy, 8vo. stitched, | ... | 0 | 0 | 0 | | |
| | Shipping Expences, &c. | ... | 0 | 12 | 0 | 6 | 4 |
| | Paid Subscription to Rafer's Antiquitates Americanæ, 1837, 4to. bound, sent per "Stag," 23d December 1842, | ... | | | | 3 | 0 |
| | Paid Subscription to Oriental Fund, for 1842 and 1843, two years, | ... | | | | 21 | 0 |
| June 12, | Sundries per Essex.—As per Invoice stated, | ... | | | | 4 | 15 |
| .. 30, | Sundry Postages to this date, | ... | | | | 1 | 3 |



And the following draft of reply to them was also read and approved of:—

Messrs. W. H. ALLEN AND CO., London.

DEAR SIRS,—By the July mail, I have the pleasure to acknowledge the receipt of your letters of the 17th and 30th June last, to the address of Mr. Piddington.

I note that the Marble Bust of the late James Prinsep, Esq. sent to you by Professor Wilson, to be forwarded to the Society has been shipped per ship "*Essex*;" on the arrival of the vessel, the Bust will be landed per bill of lading you forward.

The several statements of accounts forwarded with your letter of the 30th June last, have been found correct and in order; and although the Society is not disposed at present to disturb the account current closed to the 30th June 1843, by a balance against the Society of £13: 8: 3; yet I am desirous to say, that it is susceptible of readjustment with reference to my letter of the 16th February,* as regards the cost and charges of £18: 10: 0, for a copy of Arrowsmith's Map of India, forwarded by you per ship "*Persian*," which has been rejected by the Society as incomplete, and in consequence useless for the purpose for which the Map was commissioned from England. You have been already advised, that the Map has been made over to Messrs. Thacker and Co., to be disposed of on your account.

The property in the Journal from No. 133, is now vested in the Society; but you will continue to keep its sale account separate as heretofore, furnishing as usual, your Account Current distinct from that of the Society's other transactions with you; my interest, however ceases from No. 132, and you will therefore render up to that number a separate account to me.

The sum of £32: 17: 0, being for sale proceeds of the Journal up to No. 128, transferred to the Society's general Account Current with you, has been adjusted here at the exchange of 1s. 11d. per Rupee in Co's Rs. 342: 12: 6, the rate of exchange, London on Calcutta, ruling on the 30th June. I am dear Sirs,

Your faithfully,

H. TORRENS,

Vice President and Secy. As. Socy.

*Asiatic Society's Rooms, Calcutta,
5th September, 1843.*

Read the following letter from the Secretary to the Bombay Branch of the Royal Asiatic Society:—

To the Secretary to the Asiatic Society of Bengal, Calcutta.

SIR,—By desire of the Bombay Branch of the Royal Asiatic Society, I beg to enclose bill of lading of a case of Geological Specimens addressed to "Curators of the Museum of Economic Geology of India," shipped on board the "*Fazal Rubany*," Capt. Stewart. I shall forward a list of the Specimens, together with such remarks as may be required, with the duplicate of the bill of lading. Freight has been paid here.

I have the honor to be, Sir,

Your most obedient servant,

JOHN G. MALCOLMSON,

Secretary B. B. R. A. S.

*Bombay, Asiatic Society's Rooms,
5th August, 1843.*

* Not yet dispatched with reference to this paragraph.

The Curator stated that the box would be landed in the course of the following day.

Read the following extract of a letter from Professor Wilson to the Sub-Secretary, dated 5th May, and brought out by Dr. Sprenger, who being present, was introduced to the Society by the Honorable the President :—

To H. PIDDINGTON, Esq., *Secretary, Asiatic Society.*

DEAR SIR,—I have requested Dr. Sprenger, who comes out in the Company's Medical Service, to take charge of the following Books for the Society :—

Sama Veda, Text.

Ditto, Translation.

Megha Duta, new edition.

Selections from the Mahabharata.

The two former I send on behalf of the Oriental Text Society, and the Oriental Translation Fund Committee—the two last upon my own. Yours truly,

East India House, 5th May, 1843.

H. H. WILSON.

Read the following from Prince Ghulam Mahommed, accompanying a clay bust made by a native artist :—

E. BLYTH, Esq. *Curator, Asiatic Society, &c.*

SIR,—I beg you will present to the Society, with my best respects, the accompanying Bust of their late President, the Honorable H. T. Prinsep, Esq. as a small token of my esteem of the public worth of the individual whom it represents, and I trust the Society will do me the honor of accepting it as the offering of their most sincere well-wisher.

I remain, Sir,

Russapuglah, 23rd August, 1843.

Your obedient servant,

GHULAM MOHAMED, PRINCE.

Read the following letter from the Secretary to the Agricultural and Horticultural Society of India :—

H. TORRENS, Esq. *Secretary, Asiatic Society.*

DEAR SIR,—As I believe, under the present system of publication, there is no objection to an interchange of the Journal of the Asiatic Society with those of other bodies, I beg on behalf of the Committee of Papers to state, that the Agricultural Society will be happy to exchange Journals with your Society. The interchange can commence with the Journals of the respective Societies from the beginning of the current year, should this proposal be acceded to.

I am, dear Sir,

Your's faithfully,

JAMES HUME,

Honorary Secretary.

*Agricultural Society's Room,
Town Hall, August 17, 1843.*

The proposed exchange was agreed upon.

Read the following extract of a letter from Dr. Spilsbury to the Sub-Secretary, relative to the Mammoth Head brought down by Lieutenant Hickey :—

MY DEAR SIR,—I really have been quite horrified at the announcement in the Journal, (No. 136, or 50 N. S.) received last night of the Head from your *zealous contributor*. The history of that Head is as follows, and the Society at present have no more right to it than I have. It was exhumed at Brimhan Ghat, by the late Capt. M. Smith, then in charge of the Saugor district, (vide Journal, vol. viii. for 1839, p. 951 and its foot note.) He carried it to Saugor where I saw it, and where he gave it to me ; I then gave it to Cautley (for comparison, as I had sent a very large one previously to the Society,) and offered to convey it to Agra, which I did, and here all trace was lost for a long time. I could get no answer about it from Dr. Woodburn, the Garrison Surgeon, and it must have lain two years in his compound, not at Kamptee as you state. When H. with his Corps went from Saugor to Agra, I requested him to make enquiries, and let me know, which he did, stating, that it was all safe in W's. compound, of which I informed Cautley, who requested me when opportunity offered to send it to Calcutta, care of Cantor and Co. When H. was leaving Agra for Barrackpore, he asked me if he should take this Head in his boat, and which I gladly availed myself. About this time Cantor's house failed, and there was therefore no use in sending it to them, and it remained with H. pending Cautley's *hookum*. I shall write to Cautley to-morrow, and see what he says. I hope you duly received my remittance of 20th ultimo.

Benares, 15th August, 1843.

Read the following extract of Letter from Lieutenant Hutton :—

MY DEAR SIR,—I have the pleasure to announce the dispatch per Banghy to your address, of a small packet containing specimens for analysis of the wax or wax-like substance deposited on the leaves of a tree growing above Rajpore, by the larvæ or "*Flata limbata*," an insect closely allied to *F. Nigricornis*, a figure of which you will find in Donovan's Insects of China. The specimens of wax I should feel obliged by your analysing, and adding the results in a note to my remarks. There are likewise two specimens of the perfect insect in a little box which can be added to the Society's Museum after inspection. Can you tell me whether the Society possess any specimens of ores and minerals which they would exchange for any duplicates I may have of Minerals, &c. from Afghanistan and parts of India? Also, whether they have any duplicate insects for exchange? All of course in good condition. I wish much I could furnish you with the localities from which your Himalayan collection sent down by me, was presented ; but my memoranda were destroyed during my absence in Afghanistan, and I cannot tell what you have received. Could you tell me what you had received together with the numbering of the specimens, I might perhaps tell, from my geological report and the aid of my own specimens, where yours are from.

I will in a day or two remit you the amount of my subscription, which is due for two or three quarters, I fancy.

Yours very truly,

J. HUTTON,

M. A. S.

Muzsooree, 23rd August, 1843.



Read an application from L. Wray, Esq. requesting the Society's patronage of a work now publishing by him, under the title of "The Sugar Planter's Companion." It was considered by most of the members that this subject was so peculiarly within the province of the Agricultural Society's pursuits, that it might be better left wholly to that body.

Read the following letter from Captain Tickell to the Secretary :—

MY DEAR TORRENS,—I have the pleasure to send you a sketch of a curious kind of Tiger, made from a skin obligingly lent me by Lieutenant Biddulph, one of the residents here. The sketch and notes thereon I should wish to have published in the Journal, if they be thought worthy. And when they are done with I beg they may be returned to me, for I have no copy by me for my own collection. I hope this can be managed without trouble.

S. R. TICKELL.

Darjeeling, 11th August, 1843.

P.S.—When opportunity offers, I wish you would express my apologies to Mr. Piddington for my not having answered his note, about the skulls of the different tribes in my part of India. It reached me but an hour or two before I started for Darjeeling, and what with sickness and travelling, I have had no opportunity for replying to him. I doubt whether skulls could be procured in Singbhoom, as they are there exceedingly jealous about their dead, and burn the bodies to ashes, bones and all.

A lithographic proof of the drawing, which had been already prepared for the Journal, was exhibited, and as the work of a native artist, its extreme fidelity was much admired.

Read the following extract of Letter from Dr. Campbell, Resident at Darjeeling.

H. PIDDINGTON, Esq. *Secretary, Asiatic Society.*

I have sent you by to-day's Banghy, specimens* of the Rock Salt of Eastern Thibet, which is brought here for sale by the Thibetans through the passes in the snowy range leading into Sikim. I may forward a note of particulars regarding this article at some future time. When purified by solution for recrystallisation, it is snowy white, and far superior for the table to the Indian salt. The price here at present is 5 seers per rupee.

Yours truly,

Darjeeling, 7th August, 1843.

A. CAMPBELL.

Read the following Letter from Capt. Hannington, addressed to the Sub-Secretary :—

H. PIDDINGTON, Esq., *Secretary to the Asiatic Society.*

MY DEAR SIR,—In the Journal of the Asiatic Society, No. 65, for May 1837, there is an article by Mr. H. T. Prinsep, on the mortality among members of the Civil Service. The table prepared by him, is from its extreme accuracy very valuable; but it would be still more so if brought up to the present time according to the method he has pointed out. It is indeed probable, that the register has been kept up, but I do not know by whom, or where to apply for information respecting it.

I therefore take the liberty to ask your aid in procuring it. I am prosecuting some inquiries of this nature, and the results if worth any thing, would be much at

* No. 1. The red coloured salt.

„ 2. The white crystals found in the former in the proportion of 5 per cent.

„ 3. Bits of minerals found in the salt.

your service for publication in the Journal. If the Table can be obtained, I would put it into such form as would render it available for determining the expectation of life, and the values of annuities.

Knowing your zeal in these matters, I need not apologize for the trouble I am giving you.

Purulia, 21st August, 1843.

Yours very faithfully,

J. HANNINGTON.

The Sub-Secretary stated, that he had already addressed Mr. Charles Prinsep, who had pointed out various sources of probable information; others were suggested by the meeting, and amongst them the Honorable the President mentioned the information procured, and printed by a Committee of which Major Henderson was Secretary, and himself a member, of which the object was to found a Life Assurance Society for the benefit of the Civil Service, which had been printed in the Transactions.

Read the following Letter from B. H. Hodgson, Esq. Resident at Kathmandoo, accompanying a Catalogue of Nepal Birds, &c. :—

MY DEAR SIR,—I hope you have before this got my six boxes of specimens sent by Steamer, care of Messrs. Charrier and Co. Patna, also the tin box sent by Dak a few days ago.

The enclosed exhibits the whole arranged in the modern genera, and is by far the vastest Catalogue yet produced of Indian Birds. I wish Mr. Blyth to compare it with the specimens and then to publish it; after which the whole of the specimens and catalogues are to be sent home by my Agents, Colvin and Co., addressed to B. Hodgson, Esq. Longport, Canterbury. I have corrected the catalogue so far as I have time, and deem it sufficiently correct now to appear, but wish Mr. Blyth's prior revision.

Yours very truly,

Nepal, 22nd August, 1843.

B. H. HODGSON.

Read the following Letter and enclosed Reports from Capt. D. Williams, Assistant Commissioner at Arracan :—

MY DEAR SIR,—The Soogree, or Head Revenue Officer on the island of "Reguing" or "Flat Island" has just made a report, of which the enclosed is a translation, that on the 26th, 27th, 28th and 29th of last month, a Volcano broke out in the sea a little distance South of "False Island," and a new island was formed.

On reference to a chart of Arracan, you will see that "False Island" is East of "Flat Island," and the latter is South of "Round Island," whence I obtained the copper ore I lately sent to the Asiatic Society; the group is situated on the S. E. shore of the island of Chedooba. I consider the subject of sufficient interest to report on to the Society, especially as regards its vicinity to the island where the copper ore was found.

Your's truly,

Ramree, August 9, 1843.

D. WILLIAMS.

P.S.—I have sent for specimens of the soil of the new formation.

Translation of a Report from Mungtee of Regwain.

Mungtee, an inhabitant of the Purgunnah of Regwain, represents that on the south of the island of Joyghoyá-een, which is situated within his jurisdiction, there arose at a

distance of about thirty bamboos a new island, where from the 19th to the 22d Wachloo,* of the Mughee year 1205, there appeared of a sudden a fire (supernatural fire.) Considering this as a subject of importance, the petitioner brings the same to the notice of Hozoor.

ترجمہ مکہ

رنگیوں پر گنہ کا سوکری غلام مسے منگتے نے خداوند کا جناب
 علی میں عرض پہونچاتا ہی
 غلام کا علاقہ حی گیوائیں زنجیرہ کا دکھن طرف اندازی ۳۰ تیس
 بانس کا تفاوت میں نیا زنجیرہ ہوکے سنہ ۱۲۰۵ مکہ واپلو
 مہنا کے اونیس ۱۹ تاریخ سے لغایت مہنا مذکور کا بائیس ۲۲
 تاریخ تک ناگانی آگہہ اوتھایا ہی اسی واسطے غلام نے اسبات
 اپنا اوپر واجب جانکر کے حضور میں اطلاع کرتا ہوں اسمیں
 خاوند مالک ہیں *

ترجمہ کیا گوکل چندر داس بندوا مکرر نے ملک ہوائیں
 مکرر کے ساتھ

It was proposed and carried unanimously, that the Secretary be requested to draw up for the approval of the Society, a representation to Government, setting forth the great scientific and other advantages which might be derived, were a qualified person deputed to examine and report upon the singular and highly interesting phenomena adverted to in Capt. Williams' communication; inasmuch as some account of the Volcano would be most eagerly looked for by the scientific world at home, and its proximity to us would render neglect on the part of the Society most inexcusable, and indeed disgraceful.

The Curator Museum Economic Geology and of the Geological and Mineralogical Department, stated, that ill health for the last month had prevented his drawing up his report; but he begged to read part of it, being a report on a reference from Government relative to a newly discovered Sulphur bed, at Kurachee in Scinde, as follows:—

No. 32 of 1843.

From Captain J. PREEDY, Collector and Magistrate, Kurrachee, to Captain C. J. BROWN, Commissioner in Scinde, Hyderabad.

SIR,—I have the honor to report for your information, that I have discovered an apparently extensive bed or mine of Sulphur in the vicinity of Ghizree Bundur. My

* A certain Mughee month.

attention was first drawn to the spot by the native agent, Nao Mull, who pointed out to me on the surface of the ground a considerable quantity of sulphureous matter, which on fire being applied, immediately ignited. I have since had the upper surface of the earth removed in one or two places, and have by this day's post transmitted a small specimen of the Sulphur found within about a foot of the surface. As the mine is within two hundred yards of the Ghizree Creek, the Sulphur can be transported by water at a very little expence, and should it prove as productive as I have reason to expect, it will be a most valuable discovery. A great quantity of Nitre is apparent on the surface of the ground near the Sulphur mine, and this also might be turned to account.

I have, &c.

Kurrachee Collector's Office,
21st June, 1843.

(Signed) J. PREEDY, Capt.
Coltr. and Magt. Kurrachee.

(True Copy,)

(Signed) C. J. BROWN,
Commissioner in Scinde.

TO H. TORRENS, Esq., *Secretary, Asiatic Society.*

SIR,—In reply to a reference to the Museum of Economic Geology from Mr. Secretary Thomson, accompanying a small specimen of Sulphur sent from Kurachee, by Captain J. Preedy, I have the honor to Report as follows:—

1. The specimen in question was unfortunately so very minute in quantity, that nothing but approximate notions of the real value of the mineral can be formed. The whole weight did not much exceed 20 grains, of which 10 grains were taken for experiment.

2. Heated in a porcelain capsule, the 10 grains left a residuum of 4 of a fine dark coloured carbonaceous-looking ash.

3. It was not worth while to examine this small residuum, since if it contains any thing of value, which is but barely probable, we shall better be able to ascertain it when we obtain larger supplies of the mineral.

4. Approximately, then we may say, that the specimen contains about six-tenths, or 60 per cent. of sulphur, probably of tolerable purity, though a larger quantity will be required to decide upon this point, as also if the residuum contains any thing worth looking after. I solicit the attention of Captain Preedy, to whom I presume a copy of this Report will be sent, to the following remarks and suggestions.

5. I assume from his account that there is plenty of it, and thus do not advert to the *quantity* of the mineral.

A. The question as to the value of sulphur, depends mainly on its purity. The common sulphurs, manufactured or produced from copper or iron pyrites, are all contaminated by impurities, such as arsenic, selenium, and the like, which render them wholly useless in many branches of the arts, and the high value of the pure Sicilian sulphur, about which it will be remembered we were two years ago on the point of going to war, depends on its purity. The deposits from which these are procured are like this which I suppose ours to be, *i. e.* alluvial, and have no known and direct connection with volcanic action.

B. Your beds or layer of sulphur may be some pure and some impure. We should be glad to be furnished with at least half a pound of each sort as far as you can penetrate, with some of the earthy matrix in which it lies. Specimens of the minerals (as gypsum, &c.) found with it, and specimens of the intervening beds, if there are any such. Also of the nitrous efflorescence on the surface.

C. If you can also oblige us with accounts of the surrounding rocks or soil with specimens, it will add much to the value of the information. In short, a good account of the sulphur field or ground, with specimens, is a great desideratum.



D. You may in the mean time establish a little sulphur manufactory with only a few common earthenware pots and water spouts, as follows:—*

Prepare a common water jar by coating it over outside with a little wet mud, to which a small quantity of lime and cow-dung has been added.

Set this jar sloping in an earthen furnace, with two earthen supports for it, the side to lean on the front wall and the mouth to be outside, the fire to be put in at the back. Two inches of space at most, should be left to allow the fire to play a little round the belly of the jar, but remember that no great heat is required; all that is wanted is to distil over the sulphur at a gentle heat; a strong heat will both burn it to waste, and by making it grey, lower its price. If your heat is well managed, you will get pure, bright, sulphur-yellow produce. Fill it with the mineral broken to lumps not exceeding the size of a walnut.

E. Over the top of the jar, put the head as shewn in the sketch which is only another earthen pot with an earthenware water spout fixed into it, the end of which is also fixed into a smaller jar in the bottom of which is a hole of about one inch in diameter. The spout should be supported by a forked stick.

F. The jar is placed (supported by a bamboo frame,) over a tub of water; the whole of the joints of the apparatus are to be kept tight by plastering mud and cow-dung, and winding a few strips of coarse cloth or gunny smeared with it about them.

G. The whole arrangement is, it will be seen, nearly that of the native distillers; but the difference when at work is, that the head and pipe are allowed to remain warm, the object being to sublime over the sulphur in vapour from the jar and condense it, when it flows in a melted state through the hole at the bottom: as very little heat is required, the fire place need not be more than eight inches below the belly of the jar.

H. In the water a square wooden mould, of say six or eight inches cube, with sides tied together may be placed. As the melted sulphur flows in, it will fill this and probably adhere, so as to form a cubic block which is a highly favorable shape for stowage. It should be remarked, that the roll-shaped sulphur is that of the common impure sulphurs, and this, if ours is pure, would spoil its sale (say at home?) by giving it a bad look. If a mark of any kind be left *in relief* on the bottom of the mould-box, it will appear stamped on the block of sulphur. You may, if your sulphur runs freely, receive it into an iron or earthen pan with handles, and pour it at once into the mould which should be wetted.

I need not add in conclusion, that I have here described an apparatus of materials to be found all over India, and as there are potters in every town, they can in a few days make you more convenient apparatus; as for instance, a still-head with a pipe curving downwards. It is probable that the people, seeing a valuable product obtained so easily by means so quickly within their reach, will be happy to share the produce with Government, or rent the ground; but it should not be forgotten, that after chemical purity, cleanliness is of first rate importance to the value of the drug. I shall be happy to hear of the progress of the experiment, and by the way I may say, that there are even simpler means of obtaining sulphur than this which I have given; but judging from the minute sample sent, they would not give *clean* sulphur without care and management, so I do not trouble you with them.

When you have succeeded in distilling sulphur well with one jar, you may make a double apparatus, by having two on opposite sides over the same fire, and end by having five or six in a row, as in Europe.

Yours truly,

Museum, 22d August, 1843.

H. PIDDINGTON.

* A sketch was sent with this Report, but as it only represents the common *Scoree's* apparatus, we have not thought it worth while to give a plate of it.—Eds.



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Tables of Comparative Philology, shewing specimens of the affinity of the Greek, Latin and English Languages, with the Sanskrit, Persian, Russian, Gaelic, Welsh, Lithuanian, German, Hebrew, and Anglo-Saxon. By the Rev. JAMES LONG.

The following Comparative Tables of the Indo-European languages are the result of much labour and research during the last four years. Having myself, when studying the German, Dutch, Italian, Spanish and Portuguese languages, experienced the advantages accruing from giving attention to the affiliation of languages as a guide to the acquisition of them, I hope the same principle may be of use in facilitating among Europeans, a knowledge of the Sanskrit and Persian, and also that natives of India might with greater ease familiarise themselves with the leading European languages. The Bengali and Hindi tongues, as derived chiefly from the Sanskrit, must have a number of words of common origin with the English, which is connected with the Indo-Germanic languages. Steam is now increasing the intercourse between nations very rapidly, and binding the whole human race together as members of one great family, but the diversity of languages is a mighty antagonistic power. Those tables have been compiled with the design of rendering philological studies more interesting, as well as more *scientific*, and of smoothing the way to an acquaintance with different languages so necessary in the present day for religious, literary, and commercial purposes.

The rules I have laid down for my guidance in selecting words for those Comparative Tables, are,

1. To insert no word except on the *authority* of standard Philological works, as "Bopp's Vergleichende Grammatik," or Comparative Grammar of the Sanskrit, Greek, Latin, Lithuanian, Slavonian, Gothic and German languages; "Eichhoff's Parallele des langues de l'Europe et de l'Inde;" "Vans Kennedy's Researches into the origin and affinity of the principal languages of Europe and Asia;" "Pri-chard's Eastern origin of the Celtic nations;" and many other publications.

2. Those words are considered as *cognate*, which are similar, or nearly similar in sound and meaning. Though sometimes the significations be not precisely the same, yet the difference is only such as might arise from a natural connection of ideas. Thus "the Sanskrit *kúma*, a lake, and *κυμα*, a wave; *stoma* the head and *στομα*, the mouth; *balam*, an army, and *bellum*, war, are clearly identical terms." As no two nations ever had exactly the same alphabetical and grammatical systems, it is evident that words in passing from one into the other, must have undergone some change in their consonants and vowels. Sir W. Jones himself, who was a very cautious Etymologist, has observed: "We know, *a posteriori*, that both *fitz* and *hijo*, by the nature of two several dialects, are derived from *filius*; that *uncle* comes from *avus*: and *stranger* from *extra*; that *jour* is deducible, through the Italian, from *dies*; and *rossignol* from *luscinia*." Etymological studies have been fixed on a firm basis by the Germans, and are conducted on ascertained principles. The great philological law by which modern Etymologists are guided, is, that no permutation of letters is allowed arbitrarily, it must be sanctioned by the usage and genius of the languages compared. Sir I. Newton, by applying the principles of the inductive philosophy to the material world, disclosed the arcana of nature's laws. Cuvier acted on the same system in his researches into Comparative Anatomy; and Bopp has succeeded equally well by grounding his rules for Comparative Philology on the broad basis of groups of languages. Who would suppose at first sight, that *stranger* is connected Etymologically with the Greek *εκ*; here is the inductive process; with *εκ*, *εξ* is cognate, then the Latin *ex*, *extra*, *extraneus*, the old French *estranger*, modern French *etranger*, and English *stranger*. The French *eveque* and English *Bishop* have not one letter the same, yet they are both acknowledged to be derived from the Greek *επισκοπος*.

3. I allow in the tables of those languages being *cognate* which have, in addition to an analogy in grammatical forms, a large number of original words expressive of the most *natural* and *simple* ideas, terms for family relations and the objects of visible nature, and verbal roots of the most frequent occurrence. This excludes all those words which commercial or literary intercourse might introduce.

4. Words, which in their primary signification denoted the properties of objects of sense, are applied to express the analogous mental qualities. Thus the words, a *sanguinary* man and a man of *sanguine* temperament are both derived from *sanguis*, blood. They are sometimes restricted in meaning; thus *rector* in Latin signifies a ruler, but in England it is limited to a clergyman of a certain official dignity, and in Scotland to the head-master of a classical school. *Corps* in Latin, signifies the body, the English words derived from it are—corpse, a dead body; corps—a body of soldiers;—corporation, a municipal body. We use *villain* in the sense of a wicked person, formerly it meant only a villager.

The languages of which I have given *specimens* for comparison in those tables belong to the Indo-European class, and have been spoken in a range of country extending from the Indian Ocean to the Atlantic, and from Ceylon to Iceland. The chief branches, are,

1. The *Persian*, denoted by (P); its primitive form was the Zend, the sacred language of the Magi, adopted by Zoroaster, and spoken by the ancient Persians; the Pehlvi, a cognate tongue, was spoken by the Medes and Parthians. Persian is incorporated very largely into Urdu.

2. The *Hebrew*, denoted by (H); the notion is now exploded that this was the parent language. Its cognates are Arabic, denoted by (A), Syriac, Chaldee and Phenician.

3. The *German*, denoted by (G); the Dutch bears a close affinity with German.

4. The *Gaelic*, denoted by (Ga); it is cognate with the Erse or Irish.

5. The *Welsh*, denoted by (W)

6. The *Cymraig*, denoted by (C); it is cognate with the Welsh, Cornish, and Armoric, and belongs to the Celtic family.

7. The *Russian*, denoted by (R); it differs little from the Slavonic, which is the ecclesiastical language of Russia.

8. The *Lithuanian*, denoted by (Li); it is of Slavonian origin, and is still spoken in Courland and Lithuania. The ancient Prussian is a dialect of it.

9. The *Anglo-Saxon*, denoted by (S); it was the ancient language of England, and forms the basis of the English tongue.

10. The *Latin*, denoted by (L); the French, Spanish, Portuguese, Italian, and part of the English language are derived from it.

11. The *French*, denoted by (F); on account of its general spread, language is mentioned here.

12. The *Gothic*, denoted by (Go). This language was in constant use for probably 1500 years, as the tongue of the rude and widely dispersed tribes that inhabited Thrace and Germany.

13. The *Arabic* denoted by (A); few words are inserted, as many were the same as the Persian.

14. The *Greek*, expressed by its own character.

15. The *English* known by being printed in Italics.

16. The *Sanskrit*.

No word is inserted in those tables which is not cognate with the Sanskrit, which is used as the common centre for all; hence many words, which are cognate with the Sanskrit, but not with either the Latin, Greek or English, are omitted. The field is wide, every year will add to the discoveries and improvements made in the science of Comparative Philology. The old system of etymological investigation, which limited the field of observation to one or two languages, is now abandoned. The discovery of the Sanskrit language has quite altered the mode and form of etymological researches. These tables collect in *alphabetical* order, (so as to facilitate reference,) what is scattered in *many scarce and expensive* works. I hope they may tend to make philological studies an exercise of the reasoning powers, and not a mere effort of memory. Comparative Philology might form a useful branch of study in seminaries of learning. It serves to produce a deep impression on the mind in favour of the great truth,—that mankind were originally one. The figures appended to some words indicate the number of words of similar origin in the same language; the third column gives the meaning of the Sanskrit.

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------------|-------------|---------------|---|
| Αἷτις 25, | Hetu 6, | cause, | <i>Li.</i> ozys, <i>L.</i> agnus. |
| Αἷξ 6, | Aja, | goat, | <i>L.</i> libo, <i>Li.</i> limpu, <i>L.</i> limus, <i>G.</i> leim, <i>R.</i> lipnur. |
| Αλειψω 40, | Lip 27, | anoint, | <i>L.</i> argentum, <i>argent.</i> |
| Αργυρος 32, | Rajata 10, | silver, | <i>Ga.</i> athair, <i>W.</i> awyr, <i>G.</i> heitre <i>L.</i> æther, <i>ethereal</i> |
| Αἰθηρ 40, | A'shtra 14, | the sky, | <i>L.</i> ambo, <i>Li.</i> abba, <i>Go.</i> bai, <i>G.</i> beide, <i>R.</i> oba. |
| Αμψω 9, | Ubha 11, | both, | <i>P.</i> gillah. |
| Αγέλη 11, | Kul 76, | herd, | <i>G.</i> ach, <i>C.</i> och, <i>ache.</i> |
| Αχος 11, | Aka, | pain, | <i>L.</i> omnis, <i>Ga.</i> an, <i>C.</i> a. <i>omniscience.</i> |
| Αμα 2, | Amá 6, | together, | |
| Αναπέδον, | Anupadam, | on the foot, | <i>Go.</i> ana, <i>W.</i> enyz, <i>L.</i> animus, <i>Ga.</i> anain, <i>animal.</i> |
| Ανεμος 31, | An 4, | breath, | <i>L.</i> in, <i>Go.</i> un, <i>inactive.</i> |
| Ανευ 4, | An 217, | without, | <i>Ce.</i> nér, <i>P.</i> nar, <i>Ga.</i> anear. |
| Ανρη 78, | Nar 29, | man, | <i>L.</i> angustus, <i>G.</i> enge, <i>Li.</i> anksztas, <i>R.</i> uzki, <i>C.</i> agos. |
| Αγχι 13, | Anke 2, | near, | <i>G.</i> wehe, <i>Li.</i> weju. |
| Αω 18, | Vá 65, | blow as wind, | <i>Li.</i> wadinu, <i>L.</i> andió, <i>audible.</i> |
| Αυδη 20, | Vad 33, | to speak, | <i>H.</i> áráh, <i>L.</i> haurio, <i>Ga.</i> airde, <i>heresy.</i> |
| Αἰρεω 145, | Hri 7, | take, | <i>αδην</i> , <i>Ga.</i> adh, <i>W.</i> at. |
| Αδία 15, | Adhi 80, | superiority, | <i>Aromatic.</i> |
| Αρωμα, 5, spice, | A'ráma, | garden, | <i>Argent.</i> |
| Αργον 21, | Arjun 2, | white, | <i>Aristocracy.</i> |
| Αριστος, noblest, | Arishta 7, | happiness, | <i>L.</i> alo, <i>Go.</i> alia, <i>ολος</i> , <i>all</i> , <i>G.</i> alle, <i>W.</i> oll. |
| Αλις 12, | Alam 2, | enough, | |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--------------------|-------------|-------------------|--|
| Αἰσσω 27, | Asa 39, | move, | |
| Αἰδεω 33, | A'drita 2, | respected, | |
| Αραβοϛ 5, | A'ráv, | sound, | |
| Αρουρα 28, | Urvará 3, | fertile soil, | <i>L. arvum, A. ardhi, arable, Ga. ar.</i> |
| Αυγη 47, | Achha, | transparent, | <i>Li. aszkus.</i> |
| Ακανθη 32, | Kañtak 22, | a thorn, | <i>L. acanthus.</i> |
| Αινω, | Nu 6, | praise, | <i>Ga. àin.</i> |
| Αἷτω, | Yách, | request, | <i>Axiom.</i> |
| Απο, | Apa 304, | from, without, | <i>L. ab, Go. ab, Li. ap, G. auf, off, R. ob, Ga. o.</i> |
| Αρι, | Uru 29, | much, | <i>Go. àiriza, G. ehre, Ga. air, C. ar.</i> |
| Αρησ, | Ari 13, | enemy, | <i>Ga. ar, W. aer.</i> |
| Ασθενεια 33, | Asustha, | unwell, | |
| Αυζειν 35, | Uchh, | conglomerate, | <i>L. augeo, Li. augu, L. ex, G. hoch, εζω, W. uch.</i> |
| Ατμη 13, | A'tmá 68, | wind, | <i>Go. ahma, G. athem, atmosphere.</i> |
| Αστρον 17, | Táran, | star, | <i>P. sitára, L. astrum, Go. stairno, G. stern.</i> |
| Αλεια, warmth, | Ul 1, | to burn, | <i>L. vulcanus, volcano.</i> |
| Απρος, complete, | Vrittas 20, | performed, [ing, | <i>G. werth, Li. wertas, worth.</i> |
| Αδινον, excessive, | Sádhanam 8, | exhaust, complet- | |
| Αγος, crime, | A'gas, .. | sin, | |
| Αττον, nearer, | Ata, | move to, | <i>L. ad, F. ad, Go. ad, C. at, Gñ. eath, R. do.</i> |
| Ανα, | Anu, | near to, | <i>Go. ana, Li. na. Ga. ann, G. an, one, R. na.</i> |
| Ακρον, | Agra, | summit, | <i>akrospire.</i> |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--|---|---|---|
| Αρκτος, Αρχι, Αγαω, Ανια, <i>trouble</i> , Αγερω, Αρδω, Αδω, | Riksha, Arha, Acha, anch, Anaya, A'graha 3, Ardra 13, I'dá, | a bear, worthy, honor, distress, seizing, moist, praise, | <i>L. ursus, arctic, Ga. art, Wa. aerth.</i> <i>Arch, G. erz.</i> <i>Go. ahia, G. achte, αγαθος, Ga. agh.</i> <i>Annoy, F. annoy, H. ánah.</i> <i>L. grego, H. ágar, exaggerate.</i> <i>Ode.</i> |
| Βαλλω 327, Βρωσις, <i>food</i> , 18, Βαρν 28, Βιος 74, Βαγμα, Βησω 280, | Pil 2, Bhriti 10, Bhára 13, Bhab 33, Vagmin 1, Vesh 10, | throw, nourishment, heavy, existing, speaking, entrance, | <i>L. pello, Li. pillu, G. bolzen, bolt.</i> <i>βρι.</i> <i>Barometer.</i> <i>φυν, Ga. bo, W. byw, biography.</i> <i>R. bain, βοαω, Ga. baigh.</i> |
| Γαμβρος, Γη 43, Γηρως 25, Γαυρον 11, Γενναω 226, Γερων 26, Γευσις, | Iámátri, Go 14, Guru, Garva 9, Jan 95, Jírna 28, Ghas 6, | [band, daughter's hus- the earth, venerable, pride, born, old, food, | <i>L. gener, L. geno.</i> <i>Go. gawi, G. gau, Ga. ee, geography.</i> <i>L. grandis.</i> <i>W. cawr, Go. gaur.</i> <i>L. gigno, Go. ginna, genius, oxygen.</i> <i>G. greise, C. grai.</i> <i>Go. kausia, L. gusto, G. koste, R. ruzsain, gustation.</i> |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-----------------|----------------|--------------------|--|
| Γοαω, | Ghu, | sound, | <i>L. gemo, Go. gauno, γεμεω.</i> |
| Γναθος, | Ganda 11, | jaw, | <i>L. gena, Li. zendas, F. joue.</i> |
| Γυνη, | Jani, | mother, | <i>R. zena, C. cena, Go. quens, kin, Ga. gein, zen.</i> |
| Δεω, deficient, | Dí 5, | waste, | [<i>F. tire.</i> |
| Δερω, flay, | Dri, | tear, | |
| Δαιω 38, | Dáh 17, | divide, | <i>Tairo, L. tero, G. zehre, C. torni, R. deru, Go. taira, G. zweie, δευρερος, δαζω, R. dwoin.</i> |
| Δαμαω 44, | Dam 12, | tame, | <i>L. domo, Ga. duine, C. dyn, G. zahne.</i> |
| Δειζω 62, | Dish 20, | exhibit, | <i>G. zeigen, L. doces, Go. teiha, G. zeige, teach.</i> |
| Δερκομαι 26, | Drish 37, | see, | <i>Ga. deare, W. drem, Li. dyru.</i> |
| Δια, | Dhi, | move, | <i>R. dlia, Ga. dlu, Li. del, W. deu.</i> |
| Διδωμι 135, | Dadámi, | give, | <i>P. daden, Ga. daigh, Li. dumi, L. dos.</i> |
| Διελων, | Dal 25, | cut, | <i>θαλω, deal, C. tyllu, Li. dallyiu.</i> |
| Δνω 18, | Dwi 126, | two, | <i>Go. twai, Li. dwi, Ga. da, C. dau, R. dwai, G. zwei.</i> |
| Δεκα 32, | Dashan 32, | ten, | <i>G. zehn, Ga. deich, C. deg, Go. taihun, P. deh.</i> |
| Δακνω 45, | Dash 10, | bite, | <i>Go. tahia, G. zacke, tack.</i> |
| Δακρυ 36, | Asru 3, | a tear, | <i>W. deegryn, Go. tagr, G. zahie, P. ter, S. ter.</i> |
| Δεμας 19, | Dehin 19, | corporeal, | <i>P. andám.</i> |
| Δονεω 12, | Dhun 10, | shake, | <i>L. domus, G. dom, R. dom, dome.</i> |
| Δωμα 62, | Dháman, | house, | |
| Δυς, | Dus 130, | bad, | <i>C. dir, Go. tus, δυη, δυαω.</i> |
| Δαηρ, | Devri, devara, | husband's brother, | <i>L. levir, Li. déwérís, R. diever.</i> |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-----------------------|------------|--------------|---|
| Δραω, <i>active</i> , | Dru, | runaway, | <i>Li. darau, Ga. drabh.</i> |
| Δρυς, 26, | Dru, | a tree, | <i>Druid, W. derw, Ga. dair, P. darakht.</i> |
| Δερμα, | Charma 37, | leather, | <i>P. charm.</i> |
| Δεσμα, | Dāma 4, | rope, | |
| Δακτυλος, | Deshiní 1, | fore-finger, | <i>L. digitus, G. zehe, F. doigt.</i> |
| Δανηαι, | Dhyai, | meditate, | <i>θεαω, G. denke, Li. dingain.</i> |
| Δυω, <i>enter</i> , | Du, | move, | <i>L. duo, endue.</i> |
| Δρεπω, | Drip, | pain, | <i>δρουπτω, G. treffen, R. droblu, Ga. drip.</i> |
| | | | [am, <i>P. yik.</i> |
| Εις, 20, | Eka 122, | one, | <i>G. ein, Li. weenas, R. odin, Ga. aon, C. un, Go.</i> |
| Εξ, 14, | Shash 11, | six, | <i>L. sex, P. shash, G. sechs, Li. szeszi, R. cat.</i> |
| Επτα, 13, | Saptan 20, | seven, | <i>P. haft, G. sieben, R. sedm, Ga. seachd, W. saih.</i> |
| Εννεα, 10, | Navan, | nine, | <i>G. neun, R. dewiat, Ga. noi, Go. nian, Li. dewyni.</i> |
| Ερχομαι, 56, | Rich 2, | go, | <i>G. reichen, Ga. ruig.</i> |
| Ερημον, 14, | Aranya, | a desert, | <i>G. armer, Go. arms, P. arámid, hermit.</i> |
| Εδω, 23, | Admi, | eat, | <i>Li. edmi, Ga. ith, C. esu, L. edo.</i> |
| Ειδω, 65, | Vida 109, | know, | <i>Li. weidas, W. wydh, Go. aithne, R. widok, G. weise.</i> |
| Εστι, 63, | Asti, | is, | <i>Li. esti, P. ast, Ga. ata, R. est, G. ist, L. est.</i> |
| Εκαστος, 6, | Ekákí, | alone, | <i>Ga. ceach.</i> |
| Εκατερος, 7, | Ekataras, | either, | |
| Ελασσων, 9, | Lesh 5, | little, | <i>Lose.</i> |
| Επαινω, 50, | Pana, 5, | praise, | <i>Ga. ain, epanode.</i> |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--------------|-------------|------------|---|
| Ερι, | Urí, | great, | Go. air, C. ar, Ga. awr. |
| Ερις, 21, | Ari, | enemy, | |
| Ετερος, 22, | Itara 4, | other, | <i>heterodox</i> , L. uter. |
| Ελαχιστος, | Lagheshtha, | light, | L. levis. G. leicht, L. lengwas, R. legkü, F. leger. |
| Εχειν, 302, | I'sh, | possess, | Go. aigh, G. eigen, <i>owe</i> , Li. jegui. |
| Ευρυς, 9, | Urí 11, | great, | Li. erdwas, G. ur. |
| Ελκος, 11, | Ulká 1, | flame, | L. ulcus, <i>ulcerate</i> . |
| Εντερον, 16, | Antra 54, | entrail, | L. antrum, Ga. eadar. |
| Εν, 5, | Su 365, | good, | C. hy, <i>eulogy</i> . |
| Εζω, 93, | A'sana 2, | seat, | L. sedeo, <i>session</i> . |
| Ερα, 9, | Irá 4, | the earth, | Go. airtha, G. erde, C. ard. |
| Εριον, 14, | U'rná 6, | wool, | |
| Εμβρυον, 7, | Bhrúna 4, | fetus, | <i>Embryo</i> . |
| Εσπερος, | Váspa 2, | vapor, | <i>Vespers</i> . |
| Εγειρω, | Jágrita 10, | awake, | |
| Ετεον, | Satyam 69, | reality, | εθος, <i>ethics, etymology</i> . |
| Ετι, | Iti 5, | thus, | L. item, Go. ith, Li. ir, Ga. ath. |
| Εται, | Api 1, | if, | Go. jabai, G. ob. |
| Εγχος, | Shanku, | javelin, | L. ensis. |
| Εικω, | Ikh, | go, | L. ico. |
| Εραω, | Bar 10, | chose, | Ga. fear, W. gwor. |
| Εργον, | U'rja 5, | effort, | G. werk, <i>work</i> , L. urgeo, <i>energy</i> , Go. waurkia. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|-------------|------------|---|
| Επι, | Api 4, | before, | L. ob, Go. bi, G. bei, Li. pi. |
| Ζαω, | Jíva, | life, | Li. gywas, P. ziad, R. ziwoe, <i>zoology</i> . |
| Ζυγος, | Yuj, | join, | L. jugum, G. joch, R. igo, Ga. ceangal, C. jau. |
| Ηρως, 8, | Shúra, | hero, | <i>heroine</i> . |
| Ησυχια, 10, | A'saka, | sitting, | Ga. asaidh, W. eiste. |
| Ηλιος, 34, | Heli, | sun, | W. haul, Li. el, L. sol, <i>heliocentric</i> , R. solnete, [<i>aphelion</i>]. |
| Ηως, | Ushas 42, | day-break, | G. ost, east, L. aurora, <i>avpa</i> . |
| Ημισυ, | Sámi 3, | half, | Semi-circle. |
| Ηλον, | Kílam 6, | pin, | |
| Θρηνηω, | Dhran 3, | sound, | G. dröhne, <i>drone</i> . |
| Θεω, | Dhú 10, | shake, | |
| Θυμος, | Dhúmas 28, | smoke, | |
| Θηγω, 16, | Tij 2, | sharpen, | Li. duma, θυος, L. fumus, G. dampf, R. dym. |
| Θυρα, 39, | Dwára 17, | door, | P. tizad, Go. tekan, Li. tikumas. [dwor, C. drys. |
| Θαρρω, 42, | Dharsha 11, | pride, | Ga. dorus, G. thür, P. dar, Li. dvaras, W. dór R. |
| Θης, 6, | Dása 11, | servant, | Li. drasa, <i>trust</i> , R. derzost, <i>dare</i> . |
| Θερος, | Trish 11, | thirst, | |
| Θλαω, | Dalita 25, | divided, | G. theile, <i>deal</i> , R. dolia, F. taille, C. tyllus. |
| Θυσια, | Tud 30, | kill, | |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|----------------|-------------|--------------|---|
| Θεω, | Dhatu 20, | basis, | Go. deds, <i>deed</i> . |
| Θουρος, | Tur 19, | speed, | |
| Θαλλω, | Dala 12, | leaf, | |
| Θηλεια | Dhayá, | little girl, | Go. thiwi, <i>R. diewa</i> . |
| Θανατος, | Hantá 3, | Kill, | θευω. |
| Ιχωρ, | Uksh 3, | sprinkle, | <i>Ichorous</i> . |
| Ιαλλω, | Il, | go, | G. eile. |
| Ιαων, | Yavana, | Greek, | <i>Ionía</i> . |
| Ιος, 8, | Visha, 2, | poison, | <i>L. virus, virulence</i> . |
| Ιστημι, 350, | Stha, | stand, | <i>L. sto, Ga. stad, W. eistedh, P. istad, R. stouu</i> . |
| Ισχος, | I'shitá 10, | power, | G. stehen, <i>eigner, εχω, Li. jagin</i> . |
| Κλεω, | Shál, | praise, | <i>L. claro, κολακεια, F. clair, clear, G. klar</i> . |
| Κογχη, 12, | Shankha 6, | shell, | <i>L. concha, conch, F. conque</i> . |
| Κενος, 17, | Shúnya 1, | empty, | G. kein. |
| Καλον, 44, | Kalya 14, | healthy, | <i>Caligraphy</i> . |
| Κασσιτερον, 2, | Kastíram, | tin, | <i>Cassiterides</i> . |
| Κυνων, 31, | Shwan 4, | dog, | <i>W. cún, canine, L. canis, Ga. cu, F. chien</i> . |
| Και, | Cha, | and, | <i>L. que, R. gologsa, S. clypian, G. a ces</i> . |
| Καλεω, 100, | Kal 20, | to sound, | G. halle, <i>κολωος, L. clamo, call</i> . |
| Καλυμμα, 60, | Kúl, | cover, | |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--------------|-------------|------------|---|
| Κελευω, 37, | Kil, | order, | <i>Chuckle</i> , <i>L. cachinnor</i> , <i>G. kichele</i> , <i>R. chikaiu</i> . |
| Καγχαζω, 10, | Káku, | laugh, | <i>L. caput</i> , <i>Ga. cean</i> , <i>G. kopfe</i> . |
| Κεφαλη, 64, | Kapála 12, | skull, | <i>L. clades</i> , <i>R. klui</i> . |
| Κλαω, 33, | Klish 5, | afflict, | <i>G. kerl</i> , <i>Li. karalus</i> . |
| Κυριος, 27, | Guru 33, | master, | <i>L. claudio</i> , <i>Go. halts</i> , <i>G. halt</i> , <i>χωλος</i> . |
| Κολλος, 42, | Khol 7, | lame, | <i>L. clavis</i> , <i>χαλινος</i> , <i>L. celo</i> , <i>G. hehlen</i> , <i>Ga. ceil</i> . |
| Κλειω, 52, | Kúl, | enclose, | <i>Crypt</i> . |
| Κρυπτω, 30, | Gup 35, | hide, | |
| Κακος, | Kachehara, | vile, | |
| Καμπτος, | Kampitas 7, | quivering, | |
| Κωμα, | Sham 12, | repose, | <i>L. comis</i> , <i>comatose</i> . |
| Κραζω, | Krush, | sound, | <i>Crow</i> . <i>L. crocio</i> . <i>G. krähe</i> . <i>Li. krokin</i> . |
| Κλυδων, | Klid 2, | damp, | |
| Κειρω, | Chiri 2, | wound, | <i>L. corium</i> , <i>crush</i> , <i>L. crucio</i> , <i>G. kratze</i> . |
| Κτισις, | Kshiti 15, | abode, | <i>Ga. cai</i> . |
| Καμνω, | Ksham 5, | endure, | |
| Κιλλος, | Khara, | ass, | |
| Κηβος, | Kapi 23, | ape, | <i>L. cephus</i> . |
| Κοραζ, | Karata, | crow, | <i>L. corvus</i> , <i>G. krähe</i> . |
| Κις, | Kíta 6, | insect, | |
| Κολεος, | Shalka 3, | rind, | <i>G. hülle</i> , <i>schale</i> , <i>hulk</i> , <i>shell</i> . |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--------------|------------|----------|--|
| Κεαζω, | Kash 4, | hurt, | Li. kassau, R. koszu. |
| Κυκλος, | Kosha 20, | globe, | H. gálal, κυλιω, <i>cycle</i> . |
| Κωμος, | Káma, | love, | <i>Comedy</i> . |
| Κωκυω, | Shoak 20, | grief, | Li. száukin, G. quack, R. kokuu. |
| Κλυω, | Shru 28, | hear, | R. sluch, Ga. cluinn. |
| Καρχαρον, | Karkara 4, | hard, | χαρασσω, <i>character</i> . |
| Κηλεω, | Kil 2, | play, | χαλαω. <i>Ga cal</i> . |
| Κυτος, | Kudi 8, | curve, | σκυτος. |
| Καλια, nest, | Kuláya 5, | nest, | L. caro, <i>carnal</i> , F. carnaval. |
| Κρεας, | Kravya 5, | flesh, | F. cruel, L. crudelis, <i>cruelty</i> . |
| Κρευρον, | Krúra 14, | cruel, | |
| Κηδος, | Kheda 10, | sorrow, | |
| Ληις 30, | Luth 2, | rob, | L. læsio, G. leid. |
| Λυω 84, | Lí 2, | liquefy, | Li. leju, C. llaith, G. lauge, R. lüanie. |
| Λεγω, | Lók 3, | speak, | L. loquor, Go. lahia, G. lache, R. likuiu. |
| Λαβω 167, | Labh 21, | take, | L. libro, <i>leave</i> . |
| Λαω 10, | Loch 5, | see, | L. luces, <i>look</i> , G. leuchte. [imlich, R. lizanie. |
| Λειχω 17, | Lih 6, | lick, | L. lingo, H. loá, Li. lezu, P. lazad, G. ligh, Ga. |
| Λυχνος, 13, | Lok 6, | shine. | L. lucerna. W. lluch. Ga. loiche. S. leohd ; |
| Λαχω, | Lagh 2, | obtain, | L. lego, Go. laika, R. leczu, Li. laigau. |
| Λιθος, | Loshta 7, | clod, | <i>Lithographie</i> . |

| GREEK. | SANSKRIT, | MEANING. | COGNATES. |
|---|--|--|---|
| Λωβη, Λυπιω, | Lup 20, Lup, | cut, vex. | R. lupiu, <i>Li.</i> luppu, <i>lop</i> , λεπτος. [R. med. |
| Μεθυ 17, Μητις 30, Μαραγον 4, Μελαθρον 2, Μαστακα 18, Μεγαρον, Μελαν 26, Μυχου 7, Μαργον 18, Μαθητης 52, Μαντις 65, Μαραινω 11, Μεγα 25, Μη 16, Μενος 14, | Madhu 38, Mati 8, Marakata 1, Malina, Mastaka 1, Mahá griha 1, Malina 24, Mukha 36, Múrkha 9, Matha, Mantri 26, Marana 2, Mahán 239, Má 1, Manas 50, | intoxication, intellect, emerald, dirty, head, great house, dirty, entrance, foolish, school, a sage, dying, great, not, mind, | W. médh, G. meth, P. mai, C. medd, mede, μααα, L. mens, Go. munds, mind, G. muth. μασταζ, masticale. [melia. L. malum, G. maal, mole, R. malewain, moil, Go. G. mund, Go. meuths, mouth, μυτις. L. morus. Mathematics. L. marcor, G. morde, R. moriu, murder. W. mawr, Ga. mór, G. mauch, <i>Li.</i> macnus, P. mah. Ga. mi. G. meinung, <i>Li.</i> mintis, R. mniu, C. mynnu, mean. [R. mater. P. madar, Ga. mathair, G. mutter, C. maw, μααα, <i>Li.</i> maiszau, C. mysgu, P. amizad, R. mieszanie. |
| Μητηρ 42, Μισγω 70, Μενεαινω 27, | Mátri 23, Misra 75, Mánya, | mother, mix, respectable, | |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|------------|-------------|--|
| Μναομαι 88, | Mná; | remember, | <i>Ga</i> smuain. |
| Μωρον 11, | Múr, | fainting, | |
| Μογεω 8, | Mogh, | move, | <i>L.</i> machinor, <i>G.</i> mache, <i>make.</i> |
| Μαω 21, | Moha, | sensuality, | |
| Μελας 26, | Mala 17, | dirt, | <i>Melancholy.</i> |
| Μετρον, | Miti 10, | measure, | <i>Go.</i> mita, <i>Li.</i> mettoia. |
| Μυω, | Mú 3, | tie, | <i>L.</i> Mutus, <i>mule.</i> |
| Μισεω, | Mish 2, | envy, | <i>Misanthropy.</i> |
| Μετα, | Mith, | unite, | <i>Go.</i> mith, <i>G.</i> mit, <i>R.</i> mez, <i>mid</i> , <i>S.</i> mid. |
| Μαγεια, | Máya 15, | delusion, | <i>L.</i> magicus, <i>magician.</i> |
| Μηκαζω, | Mish 1, | sound, | <i>Li.</i> mikenu, <i>μυθος.</i> |
| Μαργαω, | Múrchhán, | fainting, | <i>L.</i> moria. |
| Μηδος, | Medh, | understand, | <i>G.</i> muth, <i>Li.</i> mislis, <i>mood</i> , <i>R.</i> mysl. |
| Μερος, | Marman 7, | joint, | <i>L.</i> membrum, <i>μοιρα</i> , <i>R.</i> miera, <i>Li.</i> mora. |
| Μαζα, | Mánsa 14, | flesh, | <i>Go.</i> mes, <i>G.</i> mett, <i>C.</i> maeth, <i>Li.</i> miesa. |
| Μωρος, | Muhira 2, | fool, | <i>L.</i> moria. |
| Μαρνω, | Mrina, | injure, | |
| | | | [<i>C.</i> nawf, <i>P.</i> nau. |
| Ναυς 40, | Náu 7, | ship, | <i>Go.</i> nota, <i>nautical</i> , <i>L.</i> nauta, <i>Ga.</i> navi, <i>G.</i> nachen, |
| Νομος 53, | Nema 45, | precept, | <i>Astronomy</i> , <i>F.</i> nomade. • [<i>G.</i> neu, <i>F.</i> neuf. |
| Νεος 66, | Nava 33, | new, | <i>L.</i> novus, <i>W.</i> newydh, <i>Ga.</i> nua, <i>P.</i> nau, <i>R.</i> nowyi, |
| Νεφελη 25, | Nabhas 28, | cloud, | <i>W.</i> nivwl, <i>Ga.</i> neamh, <i>G.</i> nebel, <i>L.</i> nebula, <i>R.</i> nebo. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|--|---|---|--|
| Νύξ, Νηαιατος, Νευρον, Νυος, Νεερατ, Νηρος, | Nishá 28, Nichai 5, Snasá, Snusá, Nay 12, Nír 10, | night, below, nerve, daughter-in-law, lead, water, | L. nox, G. nacht, R. noez, Ga. nochd, C. nos. G. nieder, R. nizkü. G. snur, L. nervum, R. snér. L. nurus. L. nuo, Go. neiwa, G. neige, R. nesu. Nereids. |
| Ξίφος, 12, Ξυρω, 82, | Kshi 15, Kshúr 11, | wound, razor, | A. seif, H. tsává. Li. skirren, shear, G. schere. |
| Οκτω 10, Ομιχλη 2, Οδυνη 34, Ομον 41, Ολον 14, Οιτον 2, Ονομα 76, Οστειον 16, Οφρυς 22, Ορη 30, Οικος 172, Ομιλος 20, | Ashtrin 24, Megh 38, A'dínay, Sam, A'lám, Ití, Nám 8, Asthi 21, Bhrú 8, U'rmi 4, Oka 3, Mila 10, | eight, cloud, pain, similar, extensive, calamity, name, bone, eye-brow, current, house, meeting, | [seme, Ga. ochd. G. achte, P. hesht, L. octo, R. osm, C. wyth, R. vo- Li. migla, ομιχλειω, R. mgla, P. migh Anodyne. [R. samyi. Go. sama, homologate, G. samt, same, L. similis, αμα, W. oll, Ga. aile, all, G. all, Go. ols. Go. namo, W. enu, Ga. ajnm, P. nam. G. name. L. os. osteology G. braue, P. abru, R. browi. • [wes. Li. ukis, parochial, G. wick, L. vicus, Go. weihls, R. Homily. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|---------------|------------|---|
| Ομβρος, | Ambhas, 12, | water, | <i>L. imber.</i> |
| Ουσια, | Vasu, 30, | substance, | <i>G. wesen, Go. wisan, R. weszcz.</i> |
| Ορω, | Ri, | approach, | <i>L. orior, ορθος, oriental, H. ar.</i> |
| Ορος, | Vr̥ish, 14, | sprinkle, | <i>ερση, L. urino.</i> |
| Οσσομαι, | I'kshu, 4, | see, | <i>Optics.</i> |
| Οιδεω, | Edh, | increase, | . |
| Οιφεω, | Yabh, | copulate, | . |
| Οδον, | Adhwan, 5, | road, | <i>Period.</i> |
| Οιεται, | U'hate, 4, | infer, | |
| Πεταλον, | Patra, 44, | leaf, | <i>Go. fimf, Li. penki, R. piat, G. fünf, P. penj, W.</i> |
| Πεντε, 26, | Panchan, 100, | five, | <i>Go. faura, Li. pra, G. vor, L. prius.</i> |
| Προ, | Pra, 957, | before | <i>G. burgh, Li. pillis, Ga. baile, πυργος, metropolis.</i> |
| Πολιν, 77, | Pura, 13, | city, | <i>L. præ, G. vor, fore.</i> |
| Παρος, 5, | Puras, 37, | before, | <i>P. afruzad, L. buro, fire.</i> |
| Πρηθω, 30, | Prush, 3, | burn, | <i>L. lavo, R. plavaiu.</i> |
| Πλουνω, 88, | Pláv, | submerge, | <i>P. pazad, G. backe, R. peczenie.</i> |
| Πεσσω, 7, | Pachati, 13, | bake, | <i>L. penna, feather, R. ptica, G. feder.</i> |
| Πτερον, 65, | Patrin, 44, | winged, | <i>L. pensum, ποιεω.</i> |
| Πονος, 104, | Paṇa, 18, | business, | <i>L. perio, G. fahre, fare, Li. puru.</i> |
| Περαω, 66, | Pára, | get over, | <i>L. pages, G. fasse, R. pazu, fasten.</i> |
| Παγη, 117, | Pásha, 13, | noose, | |

[pump.]

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|---------------|--------------|--|
| Πιον, | Pina, 3, | fat, | |
| Πραυς 17, | Prasanna, | pleasing, | Go. friathwa, G. freund, Li. prietelus. |
| Περυσι 3, | Parut, 1, | last year, | Go. fairnis. |
| Πρυτανις 7, | Pradhán, | superior, | |
| Πετρον 16, | Prastar, | rock, | Petrify. |
| Παλλάξ 5, | Bháláka, 29, | girl, | |
| Πους 190, | Pada, 34, | move, | Li. pedas, Go. lotus, G. fuss, foot, W. pēd. |
| Παιδεω 71, | Upadesha, 10, | instruction, | Pædagogue. |
| Παω 12, | Pá, | nourish, | |
| Πατασσω 13, | Pat, | fall, | πιετω, R. padaiu. |
| Πω 105, | Pá, | drink, | L. poto, bibo, R. pitie. |
| Περι, | Pari, 350, | round, | Li. pri, Go. fair, L. per, R. pri. |
| Πιπτω 113, | Pat, 13, | fall, | |
| Προς, | Prati, 255, | to, | L. pro, Go. faur, Li. pro, G. für. |
| Πρωτος, | Prathama, 9, | first, | Li. pirnas, L. pristinus, R. peruyi. |
| Πωλος, | Phal, | fruit, | L. pullus, Go. fula, G. füllen, foal, L. filius. |
| Παρα, | Pára, 190, | surpassing, | Go. fair, Li. par, L. pro, R. pra. |
| Πυρ 106, | Prush, 2, | burn, | L. buro, G. feuer, R. pariu. |
| Πλεω, | Plu, | swim, | L. fluo, Li. plaukin. |
| Παππος, | Papu, | protector, | L. pappus, H. abba, pappā. |
| Παχυς, | Bahusas, 82, | great, | L. pinguis, R. puezū. |
| Πησσω, | Pash, 2, | bind, | Li. paszau, L. positus, pango, G. fang. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-------------------|-------------|-------------|--|
| Πορω, | Púr, 22, | fill, | Go. fairra, <i>L.</i> porro. |
| Πλαταια, | Prithu, 6, | large, | G. breite, <i>Li.</i> plotis, <i>Go.</i> braids. |
| Πρασσω, | Prich, 4, | touch, | <i>Practice.</i> |
| Πολεω, | Pal, 20, | move, | <i>Pole.</i> |
| Πολυ, | Pal, 14, | great, | Go. fulla, <i>G.</i> voll, <i>full</i> , <i>L.</i> pleo, <i>R.</i> polniu. |
| Πυθων, | Budh, | knowledge, | <i>L.</i> puto, <i>Li.</i> bundu, <i>R.</i> bdiu. |
| Πυργος, | Purí, 12, | town, | <i>G.</i> bürg, <i>Go.</i> baurgs, <i>C.</i> brig, <i>F.</i> bourg. |
| Πρεσβυς, | Prabhu, | chief, | <i>Presbyter.</i> |
| Ρεω, depart, 137, | Ri, 3, | move, | <i>L.</i> ruo, <i>Go.</i> runs, <i>run</i> , <i>ρως</i> , <i>R.</i> rieju. |
| Ρητος 86, | Rádhana, 2, | speech, | <i>Go.</i> rodia, <i>C.</i> reithio, <i>G.</i> redner, <i>R.</i> ritor, <i>L.</i> rhetor. |
| Ροιζος, | Rása, 6, | sound, | <i>L.</i> rugio, <i>Go.</i> rukia, <i>G.</i> rausche, <i>R.</i> ryczu. |
| Ρησσω 94, | Rish, 12, | separate, | <i>Li.</i> rézas, <i>G.</i> reisse, <i>L.</i> rosio. <i>R.</i> riez. |
| Ρεζω, | Rádh, 8, | accomplish, | <i>G.</i> rath. <i>Li.</i> redau. |
| Ροιβδος, | Rav, 2, | sound, | <i>Go.</i> ropia, <i>G.</i> rufe, <i>R.</i> rewu. |
| Ριγος, | Rikh, 1, | fear, | <i>L.</i> rigeo, <i>G.</i> recke, <i>rigor.</i> |
| Σαλευω, | Shal, 2, | move, | <i>Salient.</i> |
| Σειρα 12, | Seru, | chain, | <i>L.</i> series, <i>ειρω</i> , <i>Go.</i> siwia, <i>Li.</i> suwu. |
| Στερεος 10, | Sthira, 23, | firm, | <i>Li.</i> storas, <i>G.</i> starr. |
| Συν, | Sam, 550, | with, | <i>Li.</i> su, <i>Ga.</i> so, <i>G.</i> sammt. <i>R.</i> so. <i>L.</i> simul, <i>P.</i> ham. |
| Στομα 106, | Stoma, 1, | praise. | <i>G.</i> stimme. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|---|--|--|---|
| Σπλην 6, Σημα 62, Σεβω 38, Στιβαρον 42, Σταιρω 7, Σευω, Σκια 43, Σεριοις, Σπαω, Σφιγγω, Στολος, Στηνιον Στεγω, Στειβω, Σφαιρα, Σηραγζ, | Plíhan, 1, Síma, 11, Sev, 12, Sthabira, 2, Sphár, 11, Su, Chháya, 20, Súrya, Spháy, Spash, 6, Sthala, Stan, 13, Sthag, 10, Stambha, 10, Swar, 37, Surangá, 1, Tri, 160, Chatur, 30, Dhá, 40, Tras, 3, Trag, 1, | spleen, boundary, worship, fixed, throb, go, shade, sun, increase, bind, firm ground, bosom, cover, stiff, sky, hole three, four, place, fear, move, | <i>Splenetic.</i> <i>Serve.</i> <i>Stiff.</i> Go. saija, G. sãe, <i>sow</i> , Li. seju, R. sieu. P. sáyah, R. sien, Go. skadus, G. schatte. G. sonne, L. sirius, C. haul, Li. saule. L. spisso, Li. spaudziù. G. spitze. G. stiel, στηλη, Ga. stol, R. stul,*G. stuhl, <i>stool</i> . G. stecke, <i>stick</i> , Li. stegiu, L. stagno. G. stopfe, L. stipo, G. stopfe, <i>stop</i> , R. stupaiu. P. siphar, G. sphäre, <i>atmosphere</i> . Li. trys, R. tri, Ga. tri, G. drei, Go. threis. R. czetwerty, Li. Ketwortas, G. vierte. Ga. deanam. L. terreo, R. triasu. L. traho, Go. thragia, G. trage, <i>drag</i> , Li. traukin, R. [trogain. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|------------|-------------|--------------|--|
| Ταχα, | Tak, | move, | <i>Li.</i> teku, <i>R.</i> teku, <i>Ga.</i> tegam. |
| Τον, | Tam, | it, | <i>Go.</i> thana, <i>G.</i> den, <i>R.</i> tot, <i>Li.</i> ta. |
| Τερω 15, | Tarpana, 4, | pleasing, | <i>Li.</i> tarpsatu. |
| Τοκος 126, | †Tuj, 2, | offspring, | <i>G.</i> zeuge, <i>Go.</i> tauhia. |
| Τεινω 203, | Tani, 71, | extend, | <i>L.</i> tēdo, <i>G.</i> dehne <i>tend.</i> |
| Τεκτων 48, | Takshan, 4, | carpenter, | <i>G.</i> teiche, <i>Li.</i> tasau, <i>L.</i> tignum, <i>R.</i> teszu. |
| Τελειω, | Tal, 2, | complete, | <i>Li.</i> ezelas, <i>R.</i> ciel, <i>G.</i> ziel, <i>L.</i> solidus. |
| Τιθη, | Tátá, | mother, | <i>Go.</i> thiuda, <i>Ga.</i> tuath, <i>C.</i> tud, <i>R.</i> tescza. |
| Τοτε, | Tathá, 4, | then, | <i>L.</i> tum, <i>G.</i> dann, <i>Li.</i> tada, <i>then</i> , <i>R.</i> togda. |
| Τερμα, | Tarman, | limit, | <i>W.</i> tervyn, <i>Ga.</i> teor, |
| Τερρω, | Trí, | pass across, | <i>L.</i> tero, <i>L.</i> trans, <i>Go.</i> thairh. |
| Τυπτω, | Tup, 2, | injure, | <i>G.</i> tapfe, <i>tap</i> , <i>R.</i> topaiu, <i>F.</i> tape. |
| Τηρω, | Trá, 5, | preserve, | |
| Τε, | Tu, | but, | |
| Τυχος, | Tuj, 2, | offspring, | <i>G.</i> Zeugen, <i>Go.</i> tauhia, τεκω. |
| Τρυσις, | Trut, 4, | cut, | <i>L.</i> tero, <i>G.</i> driesse, τρητος, <i>R.</i> tru, <i>G.</i> trenne, |
| Τυφος, | Dhúpa, 6, | incense, | <i>G.</i> dufte. |
| Τρυγω, | Dhrák, 34, | dry, | <i>L.</i> tergo, <i>G.</i> trockne, <i>drain.</i> |
| Τερχυος, | Trina, 34, | grass, | |
| Υερον 12, | Utta, 4, | wet, | <i>L.</i> udum, <i>G.</i> otter, <i>Li.</i> udra. |
| Υδωρ 63, | Uda, 43, | water, | <i>L.</i> unda, <i>Go.</i> wato, <i>Li.</i> wandu, <i>wet</i> , <i>R.</i> wydra. |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-----------------|--------------|---|
| Υπο, | Upa, 186, | beneath, | L. sub, <i>Go.</i> uf, <i>G.</i> ob, <i>Li.</i> pa, <i>up</i> , <i>R.</i> pa. |
| Υφω 38, | Váp, 5, | weave, | <i>L.</i> opus, <i>web.</i> |
| Υιος, | Súsh, | bring forth, | <i>Li.</i> sunus, <i>R.</i> sieu, <i>L.</i> satus, <i>ιις.</i> |
| Υψου, | Uchchakais, 30, | high, | <i>W.</i> uchediad <i>G.</i> hoch. |
| Υγιεω, | Oj, 3, | strength, | <i>Hygiene.</i> |
| Υπερος, | Uttara, 66, | superior, | <i>L.</i> exterus. |
| Υγρος, | Uksh, 1, | wet, | <i>Li.</i> uktaś. |
| Υπερ, | Upari, 5, | above, | <i>L.</i> super, <i>Go.</i> upar, <i>superior.</i> |
| Φοβος 34, | Bhíshma, 55, | terror, | <i>L.</i> paveo, <i>Li.</i> bijau, <i>R.</i> boiu. |
| Φωω 60, | Bhá, 24, | shine, | <i>L.</i> foveo, <i>Go.</i> botia, <i>φαιδρος.</i> |
| Φλεξω 60, | Plush, 2, | burn, | <i>L.</i> flagro, <i>G.</i> blitze, <i>Li.</i> blizgu <i>R.</i> blistain. |
| Φαγω 112, | Bhoga, 19, | eat, | <i>L.</i> fagis, <i>anthrophophagi.</i> |
| Φωνη 121, | Ván, 15, | sound, | <i>G.</i> weine, <i>euphony.</i> |
| Φυη, | Bhú, 127, | be, | <i>Go.</i> baua, <i>be</i> , <i>L.</i> fons, <i>R.</i> bywau, <i>Ga.</i> bu. |
| Φιλεω, | Pál, | protect, | <i>φυλασσω.</i> <i>philantrophy.</i> |
| Φρισσω, | Bhrasj, 1, | parch, | <i>L.</i> frigeo, <i>G.</i> frierend, <i>R.</i> priazus, <i>L.</i> frigus, <i>G.</i> frost. |
| Χειρ 120, | Kara, 74, | hand, | <i>Li.</i> hir, <i>Ga.</i> cior, <i>cheiromanēy.</i> |
| Χθες 4, | Hyas, 1, | yesterday, | <i>L.</i> heri, <i>Go.</i> gistra, <i>G.</i> gestern, <i>yester.</i> |
| Χαμαι 7, | Bhími, 53, | earth, | <i>I.</i> humus, <i>Li.</i> zieme, <i>R.</i> zemlia. |
| Χθων 14, | Kshoni, 7, | earth, | |

| GREEK. | SANSKRIT. | MEANING. | COGNATES. |
|------------|-------------|-------------|---------------------------------------|
| Χαλκον 48, | Khalina, 2, | bridle bit, | |
| Χειμα, | Hima, 37 | cold, | Li. ziema, R. zima. |
| Χαρτος, | Hristas, 8, | joyful, | |
| Χρω, | Ghri, 21, | sprinkle, | |
| Χοιρος, | Kira, 1, | hog, | |
| Χατω, | Khan, 7, | dig, | |
| Χην, | Hansa, | goose, | L. anser, G. gans, Li. zasis, R. gus. |
| Ψαω 56, | Pas, | touch, | |
| Ωφελιμον, | Aphala, | unfruitful, | |
| Ωμον, | A'ma, | raw, | |
| Ωδη, | I'd, | praise, | L. ode, ode. |
| Ωκυς, | A'shu, | quick, | L. ocior. |
| Ως, | Yat, | as, | L. ut, Go. at |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|-------------------|---|
| Aptare, | Apnoti, 10, | provide, | Go. hafts, αφθεις, F. apte, P. yábad, H. aphad, S. |
| Œvum, | A'yu, 9, | age, | L. ætas, αιων, Ga. aois, C. eu, G. ewig. [habban. |
| Aciem, | Asra, | edge, | Go. ahs, G. ecke, C. awch, L. acer, ακη, R. ostrië. |
| Axis, | Aksha, 2, | wheel, | G. achse, Li. aszis, axle, αζων, R. os. |
| Ago, | Aj, | move, | αγω, agent, enact. |
| Anser, | Hansa, 16, | goose, | G. gans, Li. zasis, χην. |
| Aula, | A'laya, | house, | Hall, αυλη, G. halle, H. áhal. |
| Annus, | Háyana, | year, | Ένος, H. shánáh, annual. |
| Antiquus, | Antaga, 1, | dead, | αντιος, antiquity, L. ante. |
| Ambio, | Am, 205, | move, | αμφι, G. um, Li. api, C. am, R. ob. |
| Ars, | Artha, 53, | cause, | G. art, artist, αρετη. |
| Abiectus, | Avagít, | reproached, | Abiect. |
| Aveo, | Av, | excite affection, | οιω, avidity, H. ábháh. W. awyz. |
| Alvus, | Ulva, | womb, | L. vulva, alvine. |
| Arvus, | Urwará, | fertile land, | αρουρα, L. ruris, arable. |
| Anguis, | Nága, | snake, | G. unk, Li. angis, εχις, R. uz. |
| Acer, | Khara, 3, | sharp, | οζυς, F. aigre, acrid. |
| Alo, | Pál, 12, | nourish, | Aliment. |
| Ab, | apa, | separate, | Go. al, G. ab, of, Li. ap, R. ob, Ga. o. |
| Ad, | At, | approach to, | Go. at, C. at, αττω, S. æt. |
| Antrum, | Antara, 54, | within, | Εντρος, αντρον. |
| Aqua, | A'pah, | water, | Go. ahwa, Li. uppá, S. ewe, L. amnis, P. áb. |
| Aurora, | Ushas, 42, | dawn, | Li. auszras, R. utro. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|------------|---|
| Æquus, | A'ikya, | unity, | εικος, <i>equity</i> . |
| Avis, | A'ti, | bird, | αετος, <i>C. adn, aviary</i> . |
| Æs, | Ayas, | iron, | Go. aiz, <i>G. eisen, F. airain, S. æs, A. ayar.</i> |
| Arceo, | Rich, | screen, | ειργω, <i>αρκεω, coercion</i> . |
| Aut, | Uta, 2, | also, | ητε, <i>Go. aithaw, Ga. achs, C. ai, G. auch.</i> |
| Ante, | Ati, 112, | over, | Go. and, <i>G. ant, Li. at, Ga. ath, avti.</i> |
| Aries, | U'rná wool, | ram, | Li. eris, <i>εppας,</i> |
| Amarus, | Amla, 19, | sourness, | H. mar, <i>L. myrrha, μυρρα.</i> |
| Amo, | Am, 1, | honour, | ιμερος, <i>H. chamad, amiable, P. kam.</i> |
| Ansa, | Ansha, 10, | part, | H. ozen. |
| Arena, | Renu, 2, | dust, | H. cháron, <i>L. areo, F. arène.</i> |
| Arma, | Barman, 2, | armour, | <i>armed, F. armee.</i> |
| Argentum, | Rájata, | silver, | αργυρος, <i>Ga. airgidh, W. arriant.</i> |
| Alius, | Anyas, | the other, | αλλος, <i>G. jener, Li. anas, R. inyí, C. allan.</i> |
| Bellum, | Valam, | army. | πολεμος, <i>belligerent, βελος.</i> |
| Bibit, | Pivati, 27, | drink, | πιω, <i>H. phi, imbibe.</i> |
| Buccinum, | Bukka, 5, | sound, | βυκανη. |
| Bonus, | Púnys, 33, | virtuous, | L. bene, <i>benefit, F. bien.</i> |
| Cacumen, | Shikhá, 16, | top, | Li. kaukaras, <i>G. acumen.</i> |
| Calix, | Kaliká, 3, | unblown, | G. kalch, <i>κυλιζ, R. kulgan, Li. kylikas. [vos, holm.</i> |
| Collis, | Kúla, | a mound, | G. hülle, <i>κωλον, Li. kalwa, R. chholm G. kulm, καλω</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|--------------|--------------|--------------|--|
| Cordis, | Hrid, | heart, | Ga. criadhe, G. herz, καρδια, cordial, Li. szirdis, Go. [hairto. |
| Creo, | Kri, | make, | κρεω, L. cura, .G kram, Li. kromas. |
| Concha, | Shankha, | shell, | κογχη, conch, F. conchites. |
| Clam, | Chulum, | disappear, | L. clandestinus, H. alam. |
| Cælum, | Khila, | empty, | κοιλον, celestial, F. celeste. |
| Carus, | Shreyas, | excellent, | Li. geras, C. car, L. gratus, χαριεις, F. cher. |
| Carmen, | Karman, | incantation, | L. cæremonia, F. ceremonial. |
| Cano, | Gána, | sing, | Ga. canam, W. canu, F. chant, S. galan. |
| Cæsaries, | Kesha, 49, | hair, | Li. kasa, χαιτη. |
| Cædo, | Shad, 7, | wound, | G. schäder, Li. skaudus, scatke, κηδω. |
| Cortex, | Kritti, | bark, | cork, G. kork, χρως, |
| Crepusculum, | Kshapá. | night, | L. crepus, |
| Crus, | Kshura. | hoof, | H. keráng, crural, F. crural. |
| Cio, | Chi. | collect, | γaw, χεω, excite. |
| Centum, | Shatam, 66, | hundred, | εκατον, Ga. ciad, R. sto, G. hundred, Li. szemtas, P. sad. |
| Cymba, | Kumbha, 18, | water jar, | κμβος, P. khum, cymbal. |
| Caligo, | Kalusha, 3, | opacity, | αχλος, caliginous. |
| Cautes, | Kataka, 1, | rock, | F. queux, L. cos. |
| Carcer, | Kárágára, 2, | jail, | L. coerceo, incarcerate, F. cñcierge. |
| Cella, | Kula, | abode, | κλειω, H. kálá, cellar. |
| Crux, | Krichhra, 3, | pain | ικριον, cross, F. croix. |
| Candeo, | Chanda, 9, | warm, | G. scheine, kindle Go. skeina, C. cyane. |
| Calamus, | Kalama, 3, | reed, | L. culmus, G. halm, R. soloma, F. chaume. |
| Caleo, | Jwálá, 16, | flame, | Li. szilta, κηλεω, F. chaud, calefaction. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|-------------|---|
| Clavis, | Shlesh, 10, | junction, | L. clausus, κλειω, S. cæggian, <i>clavicle</i> . |
| Curro, | Char, 28, | go, | G. karren, <i>car</i> , χορος, F. char, <i>current</i> . |
| Celer, | Chalat, 14, | moving, | Li. kelu, κελης, <i>celerity</i> , F. celerite. |
| Celo, | Shal, | cover, | Ga. ceil, C. celu, G. hehle, <i>hüll</i> , κλειω, W. cel. |
| Ceva, | Gau, 75, | cow, | G. kuh, R. gowiado, P. gau, Z. gao, S. cu H. gaah. |
| Contus, | Kunta, 2, | lance, | κοντος, |
| Cingo, | Kuch, 9, | confine | κυκλος, L. coxa, <i>cincture</i> . |
| Como, | Kāma, | desirable, | κομεω, L. comis, <i>comely</i> . |
| Cerno, | Kṛī, | scatter, | κρινω, L. caro, <i>discern</i> . |
| Carbasus, | Kárpása, | cotton, | καρπασος, H. karpas, P. karfas, A. karbas, |
| Cum, | Sam, | with, | Go. ga, Ga. co, C. can, F. con, <i>commotion</i> . |
| Corpus, | Garbha, 34, | fetus, | C. corf, <i>corpse</i> , G. korper, F. corps. |
| Cranium, | Shiras, 32, | head, | Go. hwairm, G. hirn, κρανιον, F. crâne, Ga. caran. |
| Calva, | Shal, 2, | cover, | Li. galwa, Ga. coll, αυλη, L. cella, R. golowa. |
| Cirrus, | Shiroja, | hair, | κορση, L. crinis, Li. karczis, R. szerszt, S. cyrran. |
| Coxa, | Kuksha, 3, | belly, | <i>hough</i> , κοχωνη, S. hog |
| Caro, | Krabya, 5, | flesh, | κρεας, <i>carnal</i> , F. carnal. |
| Cruor, | Srabana, | oozing, | Li. kraujas, C. crau, L. crudus, <i>gore</i> , R. krav. |
| Colo, | Halin, 13, | cultivator, | Li. kalu, Go. holo, <i>colony</i> , κλαω, G. höhle, R. kalu. |
| Cadus, | Kaḍa, | waterpot, | C. caed, <i>kettle</i> , κοτυλος, R. kad, Go. kas, G. kessel. |
| Caulis, | Shala, | stake, | G. keule, Li. kolas, καυλος, R. kol. |
| Cassus, | Shesha, | diminish, | χατεω, κατα, L. casus, R. ko. |
| Clausus, | Shlishta, | connected, | κλειω, <i>close</i> , G. schluss, χωλυω, G. halts. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|---------------|-------------|---|
| Conor, | Shan, 6, | move, | κονεω. |
| Cras, | Shwas, 2, | to-morrow, | <i>Procrastinate.</i> |
| Certus, | Shraddhá, 20, | belief, | κρiтoc, <i>certain</i> , <i>F. certainment.</i> |
| Cutis, | Kritti, | skin, | κυтoc, <i>G. haut, hide</i> , <i>R. koza, cuticle.</i> |
| Credo, | Shraddhá, | faith, | καρδiα, <i>credit</i> , <i>L. credulus</i> , <i>F. credit.</i> |
| Dies, | Divasa, 23, | day, | <i>[dæg.]</i> <i>Ga. dia</i> , <i>W. dydh</i> , <i>G. tag</i> , <i>ῥαoc</i> , <i>Li. diena</i> , <i>R. den</i> , <i>S.</i> |
| Disco, | Dishta, | advised, | <i>W. dysgu</i> , <i>δεικνυω</i> , <i>G. zeige</i> , <i>Ga. teagasg</i> , <i>δοκεω</i> , |
| Dexter, | Dakshina, 7, | right hand, | <i>Li. dezine</i> , <i>Go. taihsua</i> , <i>ῥεζiα</i> , <i>R. desnaia, dexterity.</i> |
| Domo, | Dám, 12, | tame, | <i>ῥαμαω</i> , <i>Go. tamiths</i> , <i>G. zahm</i> , <i>H. dáma</i> , <i>C. dyn</i> , <i>A. tamnu</i> , <i>Ga. duine.</i> |
| Durus, | Dhri, | hold, | <i>Li. turru</i> , <i>C. tarius</i> , <i>G. daure</i> , <i>τηρεω</i> , <i>H. dor</i> , <i>P. turaz.</i> |
| Deus, | Deva, 162, | God, | <i>Ga. dia</i> , <i>C. diuw</i> , <i>θεoc</i> , <i>Li. diewas</i> , <i>P. dio</i> . [<i>G. zahn.</i> |
| Dens, | Danta, 45, | tooth, | <i>W. dant</i> , <i>Go. tunthas</i> , <i>Li. dantis</i> , <i>P. dandam</i> , <i>οδουc</i> |
| Da, | Dá, 35, | give, | <i>Li. dunis</i> , <i>ῥανοc</i> , <i>R. dan</i> , <i>Li. dünis</i> , <i>Z. da</i> . [<i>dentist.</i> |
| Debilis, | Durbala, | difficult, | <i>debility</i> , <i>F. debile</i> , <i>H. dáv</i> , <i>A. dab.</i> |
| Decus, | Tejas, 16, | dignity, | <i>C. tegwch</i> , <i>ῥει</i> , <i>G. tugend</i> , <i>indecorous.</i> |
| Divido, | Vidhava, 2, | separate, | <i>G. weide</i> , <i>L. viduus</i> , <i>iδioc</i> , <i>division.</i> |
| Dis, | Dwishas, | twice, | <i>ῥia</i> , <i>Ga. dis</i> , <i>displace</i> , <i>F. dis</i> , <i>Go. dis.</i> |
| Domus, | Dháma, | house, | <i>ῥωμα</i> , <i>G. dom</i> , <i>dome</i> , <i>ῥεμω</i> , <i>R. dom</i> , <i>Ga. dom.</i> |
| Densus, | Dehin, | corporeal, | <i>G. dick</i> , <i>ῥασuc</i> , <i>Li. duzas</i> , <i>H. dáshen</i> , <i>A. dashan.</i> |
| Dormio, | Drá, | sleep, | <i>ῥαρθεω</i> , <i>G. träum</i> , <i>R. dremliu</i> , <i>dream.</i> |
| Decem, | Dashan, 32, | ten, | <i>Ga. deich</i> , <i>R. desiat</i> , <i>Li. deszimt</i> , <i>G. zehn</i> , <i>P. deh.</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|--------------|-----------------|--|
| Esse, | Astu, | be, | <i>Essence, present, F. essentiel, Ga. as, W. ys.</i> |
| Et, | Atha, 4, | and, | <i>ηδε, G. und, Li. ir, F. et, Ga. as.</i> |
| Evanesco, | Vinášha, | disappear, | <i>Evanescet.</i> |
| Ego, | Aham, | I, | <i>G. ich, Ga. mi, C. mi, P. men, R. ia, εγω, Go. ik.</i> |
| Ensis, | Asi, 2, | sword, | <i>εγχος.</i> |
| Estus, | Iddha, 14, | blazing, | <i>αθος, G. hitze, heat, Ga. aodhair, C. etc.</i> |
| Eo, | Ay, 1, | go, | <i>Li. eimi, transient, W. he.</i> |
| Ex, | Uchecha, | high, | <i>Go. us, G. aus, Li. uz, Ga. as, C. uch, R. woz.</i> |
| Erro, | Ir, 2, | go, | <i>G. irre, err, ερρων, F. erre.</i> [S. etam. |
| Edo, | Ad, | eat, | <i>εδω, G. essen, R. iedenie, Go. itands, Ga. ith, edible,</i> |
| Fundus, | Phandas, 1, | belly, | <i>fundament.</i> |
| Femina, | Vámá, | woman, | <i>Ga. W. benw, effeminate, bean.</i> [Li. peru, bean. |
| Fero, | Bhri, 32, | bear, | <i>φερω, Ga. beir, G. bären, P. barad, R. beru,</i> |
| Fluvius, | Plava, | piece of water, | <i>πλοος, R. plawen. G. fluss, Go. flodus, S. flum.</i> |
| Folium, | Phal, 90, | bud, | <i>L. floreo, G. blühe, foliage Ga. plur.</i> [Ga. brathair. |
| Frater, | Bhrátri, | brother, | <i>Go. brothar, W. brodyr. R. brat, φρατωρ, P. braudur,</i> |
| Frons, | Pránta, 1, | border, | <i>front.</i> |
| Fuit, | Bhavati, | be, | <i>φυεται, P. bawad, beeth.</i> |
| Fanum, | Vayunam, | temple, | <i>ναον, profane.</i> |
| Ferox, | Parusha, 4, | severe, | <i>φηρ, H. pere, ferocious.</i> |
| Foris, | Vahis, | outwards, | <i>L. fores, forensic.</i> |
| Findo, | Vibheda, 31, | splitting, | <i>Bite, L. fodio, G. faden, H. bádad.</i> |
| Fetus, | Sphtíam, 9, | open as a bud, | <i>φυτος, F. fetus.</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|--------------|---|
| Focus, | Bhás, 24, | light, | φωγω, <i>suffocate</i> . |
| Fari, | Bhásá, 10, | word, | φαζω, <i>L. fas, nefarious</i> . |
| Filius, | Bálísha, 2, | young, | φύλον, <i>affiliate, F. filial</i> . |
| Fugio, | Bhíshá, 1, | dread, | <i>Li.</i> begu, φυζω, <i>R. biegu, F. fuis, refuge</i> . |
| Fremo, | Bhran, | sound, | βρεμω, <i>F. fremir</i> . |
| Finis, | Phañita, | gone, | φενω, <i>F. finis, infinite</i> . |
| Garrio, | Gri, | sound, | <i>Li.</i> girru, <i>G. girre, L. gyrus, γηρουω, R. graiu, garra-</i> |
| Genus, | Jana, 95, | mankind, | <i>Ga.</i> gean, ενος, <i>P. zenne, Li. genu, Go. kuni, kin.</i> |
| Genu, | Jánu, 3, | knee, | γονυ, <i>G. knie, Go. kniu, P. zánu, F. genou, R. gnu. S.</i> |
| Gravis, | Guru, 22, | heavy, | <i>Go. gauria, F. grave, R. grubyi, gravity.</i> [cneou. |
| Gero, | Grah, 78, | take, | <i>gesture, F. geste, P. girad.</i> |
| Gelu, | Jala, | cold, | <i>R. cholod, Li. szaltis, G. kälte, F. gelee, gelid, S. cælan.</i> |
| Gustus, | Ghasti, 6, | eat, | γενω, <i>G. kost, gustation</i> . |
| Gutta, | Hita, | poured, | χυτος. |
| Hodie, | Adya, 4, | to-day, | <i>Go. hindag, G. heute, Ga. anduigh, Li. szendien.</i> |
| Humus, | Bhúm, 35, | earth, | <i>Li. zieme, P. bum, χαμαί, Go. guma, exhume.</i> |
| Hyems, | Hima, 37, | cold, | <i>Li. ziema, χειμα, F. hivernal.</i> |
| Hora, | Hórá, | hour, | ωρα, <i>F. heure, H. aor, hourly, horsoscope.</i> |
| Hircus, | Eraka, | ram, | <i>L. hirsutus.</i> |
| Horritus, | Hrishta, | haire erect, | oppwδεω, <i>horrent</i> . |
| Hæres, | Hri, 7, | take, | <i>L. gero, χηρος, hereditary.</i> |
| Hædus, | Edaka, | ram, | <i>H. gedi.</i> |



| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|---------|-------------|----------|---|
| Id, | Iti, | it, | Go. ita, G. es, Ga, e, R. ono. |
| Idem, | Idam, | this, | L. item, F. item, <i>identity</i> . |
| Ignis, | Agni, 70, | fire, | Li. ugni, αγλη R. ogn, Ga. aghna, <i>ignite</i> . |
| Inquit, | Kāthā, 20, | word, | <i>Quote</i> . |
| Intra, | Antar, 54, | midst, | Go. undar, Ga. eider, εντος <i>under</i> , R. wnutr. |
| Ita, | Iti, 5, | thus, | ετα. |
| Itum, | Eti, 1, | going, | ιθυς, Li. eimi, Go. iddia, C. æthym, R. idu, H. atha. |
| Imbris, | Ambhas, 12, | water, | ομβρος. |
| Ira, | I'rshyā, 9, | envy, | εριζω, <i>ire</i> , R. iaryi, S. yrre. |
| Jungo, | Yuj, 40, | join, | Go. juk, Ga. ceangail, C. jau, P. yugh, G. joch, R. igo. |
| Jovis, | Div, | heaven, | H. yehováh. |
| Juvenis | Yuvan, | young, | P. yuvan, W. jeuant, Li. jaunas, G. jugend, R. iunyī, [ηβαων. |
| Jecur, | Yakrit, | liver, | ηπαρ, <i>hepatic</i> , F. hepatique. |
| Jus, | Yúsha, | soup, | <i>juice</i> , Li. juka, R. iucha, F. jus. |
| Justus, | Yuta, 3, | adapted | <i>Justice</i> , F. justesse. |
| Jurgo, | Jarj, 2, | blame | οργιζω. |
| Loquor, | Loch, | speak, | λογος, <i>elocution</i> , Go. labia, R. likuiu. |
| Labium, | Lapanam, 7, | mouth, | C. lap. Li. lupe, G. lippe, F. levre, S. lippa, P. law. |
| Lædo, | Ludi, 14, | resist, | λαζω, G. leid, F. lese. |
| Lætus, | Hlád, 3, | delight, | λαω, <i>glad</i> , Go. lusto, Li. losztu, G. lüste. |
| Levis, | Laghu, 27, | light, | λαιος, <i>levity</i> , <i>relief</i> . |
| Ligo, | Lig, 7, | touch, | Li. laikan, λυγωω, F. lie, <i>oblige</i> , L. religio. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|---------|-------------|------------|--|
| Libido | Lubdh, | desirous, | Go. leibia, G. liebe, <i>Li.</i> lubijas, <i>love</i> , <i>R.</i> liubow, <i>H.</i> leváv. |
| Locus, | Loka, 35, | world, | λαος, G. lage, C. llach, λεχος, <i>R.</i> loze, <i>local</i> , <i>F.</i> local. |
| Lux, | Loka, 9, | shine, | Go. leiks, <i>W.</i> lhug, λευκος, <i>R.</i> luez, <i>light</i> , <i>G.</i> licht. |
| Luvium, | Lína, | melted, | λυω, <i>lave</i> , <i>L.</i> alluvium, <i>F.</i> alluvion. |
| Ludo, | Lad, | sport, | <i>H.</i> luz, <i>ludicrous</i> , λυω, <i>G.</i> letze. |
| Lateo, | Lud, | conceal, | λαθω, <i>H.</i> lát, <i>latent</i> , <i>F.</i> latent. |
| Longus, | Lagna, 4, | connected, | <i>G.</i> lang, <i>Go.</i> langs, <i>F.</i> long, <i>S.</i> lengian, <i>longitude</i> . |
| Moles, | Múla, 20, | root, | <i>Mole</i> , <i>L.</i> moles, <i>F.</i> môle. |
| Murmur, | Marmara, | rustling, | <i>G.</i> murmeln, μυρμυρον, <i>Li.</i> murmas, <i>R.</i> murcu. |
| Mirror, | Mrish, | discern, | μερδω, <i>mark</i> , <i>Go.</i> marka, <i>G.</i> merke, <i>admire</i> . |
| Mordeo, | Mrid, | grind, | μεριζω, <i>G.</i> morsch, <i>remorse</i> . |
| Murus, | Mur, 5, | encircle, | <i>G.</i> maure, <i>immure</i> , <i>F.</i> mure, <i>L.</i> moror, <i>Li.</i> muras. |
| Malus, | Mala, | sin, | <i>G.</i> mahl, μελας, <i>F.</i> mal, <i>A.</i> malam <i>malevolent</i> , <i>S.</i> mal. |
| Mare, | Míra, | ocean, | <i>Go.</i> marei, <i>W.</i> mór, <i>Ga.</i> muir, <i>R.</i> more, <i>G.</i> meer, <i>A.</i> |
| Mas, | Mánusha, | man, | <i>C.</i> mon, <i>G.</i> mensch, <i>R.</i> muz, <i>Go.</i> manna, <i>masculine</i> . |
| Medium, | Madhya, 28, | midst, | <i>Go.</i> midums, <i>G.</i> mittle, μερος, <i>R.</i> mezdu, <i>P.</i> mian, <i>marakv.</i> |
| Meum, | Mama, | mine, | <i>G.</i> meiner, <i>Ga.</i> mo, <i>P.</i> men, <i>G.</i> ma. [mediate. |
| Magnus, | Mabán, 239, | great, | <i>R.</i> mogucz, <i>Ga.</i> mor, <i>C.</i> mawr, <i>Li.</i> maenus, <i>G.</i> manch, |
| Menda, | Manda, | vile, | μειω, <i>mendacious</i> . [μεγας, much. |
| Mens, | Manas, 103, | mind, | <i>Go.</i> man, <i>C.</i> wynnu, <i>mental</i> , <i>G.</i> meñen, <i>A.</i> manyi. [mass. |
| Metiri, | Mita, 10, | measured, | <i>Go.</i> mitaths, <i>μνα</i> , <i>L.</i> modus, <i>H.</i> mádád, <i>R.</i> meza, <i>G.</i> |
| Mors, | Mrita, 34, | dead | <i>Li.</i> marinu, <i>W.</i> marw, <i>H.</i> meth, <i>Ga.</i> marbh, <i>μπος</i> , |
| Mus, | Músh, | mouse, | μως, <i>P.</i> mush, <i>G.</i> maus, <i>R.</i> mysz, <i>S.</i> mus. [R. merius. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|--------------|---------------|---|
| Motus, | manth, | agitate, | μοθος, <i>Li.</i> metu, <i>G.</i> mühe, <i>R.</i> metaui, <i>motion.</i> |
| Mitto, | Míta, 4, | cast, | μεθουμι, <i>missile</i> , <i>F.</i> missionnaire. |
| Moneo, | Man, | understand, | μνηνω, <i>G.</i> mahne, <i>mean</i> , <i>R.</i> marui, <i>monument.</i> |
| Musca, | Mashaka, 5, | mosquito, | μυια, <i>midge</i> , <i>Li.</i> musse, <i>P.</i> magas, <i>G.</i> mucke, <i>R.</i> mucha. |
| Mensis, | Más, 11, | month, | <i>G.</i> mond, <i>Li.</i> menú, <i>F.</i> mois, <i>μας</i> , <i>Go.</i> menoths, <i>Ga.</i> |
| Mersio, | Mrishhta, 6, | sprinkling, | <i>Li.</i> merkui, <i>F.</i> merge, <i>immersion.</i> [mios. |
| Mulier, | Mallá, | woman, | <i>G.</i> magd, <i>Go.</i> magaths, <i>muliebrity.</i> |
| Mensa, | Mán̄sa, 16, | flesh, | <i>Go.</i> mes, <i>Li.</i> miesa, <i>μαζα</i> , <i>G.</i> mett, <i>R.</i> miaso, <i>C.</i> maeth. |
| Meto, | Mash, | cut, | <i>Mow</i> , <i>mess</i> , <i>αμετος</i> , <i>G.</i> mähd, <i>Go.</i> maita, |
| Mancus, | Manák, | little, | <i>Li.</i> menk, <i>C.</i> man, <i>minikin.</i> |
| Mugio, | Muj, 1, | sound, | μυκαω, <i>L.</i> musso, <i>mutter</i> , <i>G.</i> muhe, <i>Li.</i> myczu. |
| Mitis, | Mitra, 12, | friend, | <i>Mitigate</i> , <i>F.</i> Mitiger. |
| Muto, | Mithas, 5, | reciprocally, | <i>H.</i> mot, <i>mutation</i> , <i>F.</i> mutabilite. |
| Miscere, | Misra, 70, | blend, | μυσγω, <i>H.</i> mezeg, <i>A.</i> masak, <i>S.</i> miscan, <i>mixture.</i> [tilate. |
| Mutilo, | Mush, 26, | cut, | μασσω, <i>Go.</i> matia, <i>Li.</i> muczu, <i>R.</i> myczu, <i>G.</i> mutze, <i>mu-</i> |
| Munio, | Man, | oppose, | μενω, <i>R.</i> maniu, <i>ammunition</i> , <i>municipal</i> , <i>F.</i> munition. |
| Monile, | Maní, 29, | gem, | μανος, |
| Madeo, | Mid, 5, | liquify, | <i>Li.</i> maudau, <i>μυελος</i> , <i>L.</i> <i>R.</i> mytyi, <i>medulla.</i> |
| Meditor, | Medh, 6, | comprehend, | μυδω, <i>Go.</i> modo, <i>Li.</i> mishju, <i>R.</i> myslu, <i>meditation.</i> |
| Mundo, | Mand, 23, | ornament, | ματτω, <i>F.</i> monde. |
| Medulla, | Medas, 12, | marrow, | <i>R.</i> mozg, <i>G.</i> mark, <i>medullary.</i> |
| Nutus, | Múka, 1, | dumb, | μυκος, <i>mute</i> , <i>F.</i> muet. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|--------------|------------------|--|
| Nunciūs, | Nunna, | sent, | νεος, <i>annunciāte</i> . |
| Nutus, | Nata, | bowed, | ννω, <i>H. nuang, nod, W. amneidio.</i> |
| Nasis, | Násá, 20, | nose, | G. nase, <i>Li. nosis, R. nosada, nasal.</i> [<i>H. nakah.</i>] |
| Neco, | Násha, 26, | destruction, | <i>L. noceo, νεκος, H. nákah, νοσος, nick, A. nikayat,</i> |
| Novem, | Navan, 16, | nine, | <i>G. neun, P. nah, R. noi, εννεα, C. naw, november.</i> |
| Nox, | Nakta, 28, | night, | <i>W. nôs, Ga. nochd, G. nacht. Li. naktis, vñž, nocturnal.</i> |
| Nepos, | Naptá, | grandson, | <i>ανεψιος, W. nai, R. netü, G. neffe, F. neveu, nepotism.</i> |
| Neve, | Navá, 1, | not, | <i>νη, H. ain, Ga. neo.</i> |
| Nubes, | Nabhas, 28, | cloud, | <i>W. nev, Ga. neamh, G. nebel, C. niwl, νεφος, R. nebo.</i> |
| Nubo, | Nivará, | virgin, | <i>νυμφη, nymph, connubial,</i> |
| Nurus, | Snúsa, | daughter-in-law, | <i>ννος, G. schnur, R. snocha.</i> |
| Nos, | Nah, | us, | <i>Go. unsis, Li. mues, R. nas.</i> [nyth.] |
| Nidus, | Níd, 2, | nest, | <i>νεοττος, S. nesan, ναιταω, R. gnezdo, Ga. nead, W.</i> |
| Nomen, | Nám, | name, | <i>ονομα, G. name, R. imie, Go. namo, P. nám, Ga. ainm,</i> [S. nama.] |
| Orno, | U'rnu, 1, | cover, | <i>Adorn, ωρα, F. ornement.</i> [atachk, <i>Ga. aca.</i>] |
| Oculus, | Akshi, 10, | eye, | <i>οκκος, G. auge, Go. auga, Li. akis, R. oko, F. œil, A.</i> |
| Os, | *Ashi, 21, | bone, | <i>οστειον, osteology, F. ossu, G. ast, Z. astem, P. astekhun.</i> |
| Ovis, | Avi, 2, | sheep, | <i>οις, ewe, Li. awis, Ga. uan, C. oeh, R. owen.</i> |
| Odium, | Yuddham, 17, | war, | <i>ωθειω, odious, F. odieux, οδυσσω</i> |
| Otium, | A'sanam, | seat, | <i>Ease, Go. azi, οκνος, εζομαι.</i> |
| Ostium, | A'syam, | mouth, | <i>R. uste, L. os, ostiary.</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|--------------|--|
| Orbus, | Arbha, | child, | G. erbe, ορφανος, F. orphan, orphan. [Go. ahtan. |
| Octavus, | Ashtrama, | eight, | οκτω P. hasht, C. wyth, Li. ashtum, R. osm, Ga. ochd [pasture. |
| Pastum, | Push, 80, | nourish, | Go. fodia, G. fütter, βοσκω, R. pastuch, H. ávas, |
| Pater, | Pitri, 42, | father, | Go. fadar, P. pader, Go. athair, G. vater, R. batia. |
| Patera, | Pátra, 14, | plate, | ποτηριον, patter, πεταω. |
| Pes, | Páda, 106, | foot, | Li. péczias, P. pa, G. pfote, R. piata, πέλκος, pedestrian. |
| Placere, | Priya, 37, | please, | Placid. |
| Pluo, | Plu, 3, | go, | L. fluo, Li. plauju, G. fluss, Ga. fluich, S. fleuwan. |
| Polleo, | Bala, 17, | army, | πελω, equi-pollent. |
| Post, | Paschat, 4, | after, | Li. pas, Ga. foi, R. po, F. puis, postpone. |
| Potis, | Pati, 14, | master, | Li. pats, P. bud, ποσις, Go. faths, R. pan, potent. |
| Praelium, | Pralaya, | destruction, | L. prælum, [R. proszu, P. porsad. |
| Precor, | Prachh, 4, | inquire, | Li. prasyatas, G. sprechen, Go. fraicha, φραζω, pray, |
| Primus, | Prathama, | first, | R. perwyi, G. fürste, Li. permas, Go. fruma, primitive. |
| Prope, | Prapana, | arriving at, | R. protiw, propinquity. |
| Pullus, | Phullati, | blossoming, | πωλος, poultry, F. pulluler. |
| Putare, | Budh, 35, | understand, | πενθω, Li. bundu, impule. |
| Puer, | Putra, 25, | son, | P. pur, παις, puerile, Z. potre. |
| Puteo, | Púti, 30, | stinking, | Li. putas, πνεω, F. pus, putrid. |
| Purus, | Pú, 35, | purify, | G. butze, πυρ, F. purifier, puriton. |
| Pecu, | Pashu, 23, | beast, | Go. faihu, G. vich, πων, Ga. beathach, pecuniary. |
| Pistum, | Pish, 24, | pound, | L. pinso, πισσω, Li. paisau. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|-------------|--|
| Parvus, | Páyvas, | low, | Ga. beg, C. bach, <i>Li.</i> piggus, <i>G.</i> feige, <i>Go.</i> faws, <i>παυρος</i> , |
| Plenus, | Pulas, 14, | great, | <i>Go.</i> fulls, <i>πλεος</i> , <i>plenitude</i> . |
| Paveo, | Bhí, 55, | fear, | <i>Li.</i> bijau, <i>πτοεω</i> . |
| Piscis, | Payas, 18, | water, | <i>G.</i> fisch, <i>C.</i> pyvg, <i>fish</i> , <i>Go.</i> fisks, <i>F.</i> poisson, <i>piscivorous</i> . |
| Pingo, | Pij, 5, | colour, | <i>πικω</i> , <i>R.</i> piszu, <i>F.</i> peins, <i>paint</i> . |
| Pigeo, | Puchh, | careless, | <i>H.</i> págar. |
| Pungo, | Pija, | kill, | <i>Go.</i> fja, <i>Li.</i> piaujeo, <i>L.</i> pugna, <i>πικω</i> , <i>G.</i> fechte, <i>point</i> . |
| Puteus, | Pud, 10, | hole, | <i>βυθος</i> , <i>G.</i> pfutze, <i>pit</i> , <i>F.</i> puit. |
| Pars, | Prithak, | cast, | <i>H.</i> paras, <i>party</i> , <i>F.</i> partir. |
| Palus, | Palwala, | pond, | <i>G.</i> pfuhl, <i>πηλος</i> , <i>pool</i> , <i>S.</i> pul. |
| Pontus, | Páthis, 7, | sea, | <i>ποντος</i> . |
| Pardus, | Pridáku, | leopard, | <i>παρδος</i> , <i>G.</i> parder, <i>Li.</i> pardas, <i>leopard</i> . |
| Picus, | Pika, 7, | cuckoo, | <i>G.</i> picker, <i>F.</i> pie. |
| Palea, | Palla, 3, | straw, | <i>Li.</i> pellas, <i>R.</i> plew, <i>F.</i> paille, <i>pallat</i> . |
| Pellis, | Phalaka, 2, | shield, | <i>φολις</i> , <i>G.</i> fell, <i>Li.</i> plewe, <i>R.</i> pleua, <i>C.</i> pil, <i>S.</i> flys. |
| Portus, | Pára, | cross over, | <i>G.</i> fahre, <i>fare</i> , <i>πορος</i> , <i>ford</i> , <i>import</i> . |
| Postis, | Pash, | bind, | <i>G.</i> feste, <i>πιεζω</i> , <i>R.</i> pazu, <i>post</i> . |
| Pilum, | Pílu, 2, | arrow, | <i>G.</i> Pfeile, <i>παλλω</i> , <i>pill</i> . |
| Pugna, | Pinjja, | killing, | <i>G.</i> feind, <i>Li.</i> piaujas, <i>R.</i> pichaiu, <i>πυζ</i> , <i>F.</i> pique, <i>pug-</i> |
| Peto, | Path, 5, | recite, | <i>Go.</i> bida, <i>G.</i> bitte, <i>petition</i> . |
| Patulus, | Padal, 1, | thatch, | <i>πεταω</i> , <i>H.</i> pátháh, <i>patent</i> . |
| Quot, | Kati, | how many, | <i>κοσος</i> , <i>Li.</i> koks, <i>R.</i> kak, <i>quotient</i> . |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|-------------|------------|--|
| Que, | Cha, | and, | <i>Ka.</i> |
| Quis, | Kim, | what, | <i>Li. kas, P. ku, Go. hwas, G. wer, R. koi, Ga. co.</i> |
| Quid, | Yad, | what, | <i>κοιον, P. ku.</i> • <i>[nial.]</i> |
| Quinque, | Pañchan, | five, | <i>πεντες, R. piaty, G. fünfte, Go. fimfta. quinquen-</i> |
| Quies, | Shete, 18, | sleeping, | <i>Li. kajus, κειται, quietude, R. koiu.</i> |
| Quatuor, | Chatur, 30, | four, | <i>Li. ketturi, Ga. ceithir, R. czetyre, G. vier, τετραρες,</i> • <i>[P. chehar W. pedwar.]</i> |
| Rectus, | Rita, | true, | <i>G. recht, Go. raihts, right, S. riht.</i> |
| Rex, | Rájá, 108, | ruler, | <i>Go. rakia, Ga. righ, G. reich, C. rhi, A. reys, regal.</i> |
| Rheda, | Ratha, 29, | car, | <i>Li. ratas, G. rad, Ga. rotha, C. rhod, ρεδιον, L. rota,</i> |
| Ritus, | Ríti, | custom, | <i>G. reite, L. ortus, ορσις, ritual.</i> <i>[rotation.]</i> |
| Ros, | Rasa, | juice, | <i>ερση, roscid, R. rosa, F. arrose.</i> |
| Rapio, | Riph, 2, | injure, | <i>G. rauben, αρπαω, H. árab, Go. raupia, rob, R. rubacz.</i> |
| Ruo, | Ri, 2, | move, | <i>Go. rinna, L. rivus, Li. rauju, R. roiu, ρυω, rush.</i> |
| Rodo, | Rad, 10, | break, | <i>ρησσω, G. reissen, Li. rezas, rout.</i> |
| Rudo, roar, | Rud, 5, | wail, | <i>ροζω, Li. raudoiu, ροθος, R. rydaiu.</i> |
| Rugo, | Ruksha, | rough, | <i>G. rauhe, Li. raukiu, L. raucus, corrugate.</i> |
| Repo, | Rep, 2, | move, | <i>ρεπω, F. rampe, reptile.</i> |
| Spiro, | Spri, 1, | breathe, | <i>Spirit, F. esprit.</i> |
| Signum, | Chihma, | sign, | <i>σημειον, signify, F. signaler, S. segen, H. saman.</i> |
| Sulphur, | Shulwári, | sulphur, | <i>Sulphuric.</i> |
| Senex, | Sanna, 40, | shrunk, | <i>Li. senas, Go. sineigs, senior, W. hen, Ga. sean, A. chen.</i> |
| Sanies, | Sanas, | excrement, | <i>H. shena.</i> • |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|----------------|---|
| Succus, | Sechana, | sprinkling, | G. saft, R. sok, F. suc, suck, L. sunkiu. |
| Scando, | Skand, 6, | jump, | σκαζω, G. schiëze, shoot, Li. skecziu. |
| Suus, | Swa, | his, | G. sich, Go. seins, Li. sawas, R. swoi, εος, suicide. |
| Serpens, | Sarpa, 28, | creep, | ερω, F. serpent, serpent, W. sarf. |
| Servire, | Seva, | serve, | ερω, service, σαω, F. sauve. |
| Silex, | Shila, 28, | stone, | χαλιζ, silicious. [her, R. swekor. |
| Socer, | Swashura, | father-in-law, | εκυρος, Go. swaihra, Li. sessú, W. chwegran, G. schwa- |
| Sopio, | Swapna, 13, | sleep, | L. sapnas, G. schlaf, Go. slepa R. spanie, υπνος, soporiferous. |
| Sono, | Swan, 5, | sound, | Go. sangws, Li. zwanas, C. syniu, R. zwon, G. sang. |
| Statio, | Sthiti, 40, | place, | Go. stads, G. statte, Li. stonas, R. staiu, stationary. |
| Suavis, | Swádu, | sweet, | L. suadeo, suavity, F. suavite. |
| Super, | Upari, 5, | above, | υπερ, Go. ufar, G. uber, P. ábar, superior. |
| Satis, | Sádh, | finish, | Satiale, R. syszczaui, Li. sotinu, G. sättige, αδω. |
| Sine, | Sanna, | little, | L. situs, L. se, Go. seithu, G. seit, R. s, sinecure. |
| Sat, | Sat, | proper, | Satisfy. |
| Semis, | Sámi, 3, | half, | ημι, F. semi, semi-god. [strev. |
| Sterno, | Str.i, | spread, | στραω, L. stratum, G. strasse, Go. strauja, R. stroiu, |
| Scindo, | Khandā, 32, | tear, | σχιζω, G. scheiden, Li. skujta, Go. skaida, rescind. |
| Scutum, | Khed, 2, | shield, | σκυτος. |
| Spez, | Sprihá, 5, | desire, | σπαρη, F. espoir, despair. |
| Surrus, | Swara, 11, | sound, | G. surren, συρω. |
| Suadeo, | Swádu, | pleasing, | persuade, F. suasion. |
| Severus, | Swri, | pain | σειβεσθαι, severity, persevere. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|--------------|------------|---|
| Stupidus, | Stambha, | stupid, | στρυφνός, <i>stiff</i> , <i>Li.</i> stiprus, <i>G.</i> steiffe, <i>θηπω.</i> |
| Sol, | Súrya, | sun, | ἡλιος, <i>H.</i> hálal, <i>A.</i> halal, <i>R.</i> solntse, <i>solar.</i> |
| Serum, | Sáyam, 8, | evening, | οψηρον, <i>opos</i> , <i>F.</i> soir, <i>soiree.</i> |
| Similis, | Samatá, 550, | equality, | ομολος, <i>H.</i> semel, <i>similar.</i> |
| Scelus, | Skhalana, 5, | wicked, | σκωλον, <i>Go.</i> skuld, <i>G.</i> schuld, <i>Li.</i> skelas. |
| Socius, | Sakhi, 6, | friend, | <i>Li.</i> segu, <i>σασσω</i> , <i>F.</i> socie, <i>associate.</i> |
| Stultus, | Sthúla, 40, | dull, | <i>L.</i> stolidus, <i>stultify.</i> |
| Specio, | Spashya, 5, | see, | <i>G.</i> spahe, <i>Li.</i> spigas, <i>σκοπος</i> , <i>H.</i> sháqaph, <i>inspect.</i> |
| Spolio, | Phal, | cleave, | φλαω, <i>file</i> , <i>Li.</i> peloiu, <i>L.</i> pellis, <i>R.</i> peliu, <i>G.</i> feile. |
| Spargo, | Sphurchh, | spread, | <i>Li.</i> sprogtu, <i>σφριγaw</i> , <i>G.</i> springe, <i>spring.</i> |
| Sedes, | Sadas, 3, | meeting, | <i>Go.</i> sitts, <i>G.</i> sitz, <i>Li.</i> sedziu, <i>εδος</i> , <i>seat</i> , <i>R.</i> sazu. |
| Scire, | Súchi, 17, | espy, | <i>Sight</i> , <i>G.</i> sicht, <i>L.</i> sagio, <i>G.</i> schau, <i>shor.</i> [desiccate. |
| Sitis, | Shus.hka, | dry, 12, | <i>Li.</i> sauzau, <i>L.</i> siccus, <i>σαυκος</i> , <i>R.</i> suchü, <i>C.</i> sych, <i>desiccate.</i> |
| Satur, | Sád, 6, | weariness, | <i>G.</i> satt, <i>Li.</i> satus, <i>R.</i> sytyi, <i>Go.</i> sads, <i>S.</i> sadian, <i>satie.</i> |
| Spissus, | Sphíta, | swollen, | <i>Li.</i> spauistas, <i>σπιδνος</i> , <i>inspissate.</i> |
| Seco, | Sagha, | hurt, | <i>C.</i> sigu, <i>saw</i> , <i>L.</i> securis, <i>insect</i> , <i>sex</i> , <i>C.</i> sigu, <i>R.</i> sieku. |
| Salio, | Shal, | move, | αλλομαι, <i>Go.</i> salta, <i>F.</i> saillis, <i>H.</i> hale, <i>salient.</i> |
| Sudus, | Shuddha, | pure, | αγαστος, <i>L.</i> castus, <i>Go.</i> gods, <i>chaste.</i> |
| Taceo, | Túshníka, 3, | silent, | ακεω, <i>tacit.</i> |
| Tactus, | Twach, | move, | θιζις, <i>Li.</i> tókumas, <i>Go.</i> tekan, <i>R.</i> tykaiu, <i>take</i> , <i>F.</i> toucher. |
| Tæda, | Dah, | burn, | δαις, <i>Ga.</i> doth. |
| Tepeo, | Tap, 34, | heat, | τυφω, <i>Ga.</i> tath, <i>P.</i> tábad, <i>R.</i> teplyi, <i>F.</i> tiede, <i>tepid.</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|---------------|-------------------|--|
| Tenuis, | Tanu, 71, | thin, | L. tener, G. dünn, C. tenau, P. tanak, H. táchan, R. to-nok, ταναος, A. tanazzur, S. thny. |
| Terra, | Dhará, 15, | earth, | W. daear, Ga. tir, χωρα, Go. airiba, S. eard, A. arz. |
| Tonitru, | Stanyitnu, 2, | thunder, | τονω, S. thunar, P. tundar, G. donner. |
| Trans, | Trí, | across, | Go. thairh, G. durch, C. tros, R. czezez, Ga. thar, τρωω. |
| Tres, | Trayas, 160, | three, | Go. thoreis, Li. try, P. seh, τρια, R. tri, C. tri, S. threo. |
| Tuus, | Tvam, | thou, | G. deiner, R. twoi, Ga. do, Go. theins, Li. tawas, C. tau, W. dy. |
| Taurus, | Túvara, | bull, | W. tarw, Ga. tarbh, G. stier, Go. stiurs, H. tor, A. taur, ταυρος. |
| Tego, | Twach, 8, | cover, | G. decken, C. techu, τεγω, Li. dekis, Ga. tigh, W. ty, G. dach, R. dek, τεχος, S. thecan, protect. |
| Tundo, | Tud, 30, | wound, | θυσσω, G. tode, dead, F. tu, τυπω, Ga. tath, contusion. |
| Talentum, | Tulá, | gold measure, 14, | ταλαντον, G. zoll, toll, F. talent. |
| Terminus, | Tarman, | top, | Term, τερμα, Ga. teor, W. tervyn. |
| Tentam, | Tanti, 1, | expansion, | τεινω, Go. thania, G. dehne, tend, R. tianu, Li. tesiu. |
| Turget, | Tarjat, 3, | censure, | Turgid, οργωω. |
| Talis, | Tulya, 8, | like, | τηλικος, retaliate. |
| Tucor, | Tej, 2, | guard, | τω, tuition. |
| Terreo, | Trása, 8, | terror, | [terrify.] παρασσω L. tristes, G. trauer, Go. drobna, P. tars, |
| Tollo, | Tul, | weigh, | G. dulce, Go. thula, ταλαω, H. thálá, toleration. [dins. |
| Tenebræ, | Tamas, 23, | darkness, | G. dammern, Li. tamsinu, R. temnost, dim, P. dihms, A. |
| Torreo, | Trish, 11, | thirst, | τεροσμαι, θερος, G. dürre, F. taris, Li. trokstu, Ga. tart. |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|------------|--|
| Tondeo, | Tud, | cut, | τενδων, <i>tonsure</i> , <i>F.</i> tonsure. |
| Tumultus, | Tumula, | uproar, | <i>Tumultuous</i> , <i>L.</i> tumes. |
| Talus, | Tala, 8, | bottom, | ταλαν. |
| Tremo, | Dram, | move, | τρεμω, <i>tremor</i> , <i>F.</i> tremble. |
| Trudo, | Trut, 5, | break, | τρυνω, <i>intrude</i> . |
| Trunco, | Tribh, | hurt, | τρυνχω, <i>truncated</i> , <i>G.</i> drücke, <i>Li.</i> drozu. |
| Turbo, | Thurv, | injure, | θουρβος, <i>disturb</i> , <i>G.</i> trübe, <i>F.</i> trouble. |
| Tono, | Tan, 4, | sound, | τονος, <i>G.</i> töne. <i>F.</i> tonne, <i>intonation</i> . |
| Ustus, | Ushnam, 42, | burn, | ηως, <i>auw</i> , <i>combustion</i> , <i>H.</i> esh, <i>ashes</i> . |
| Uterus, | Udara, 13, | belly, | ουθαρ, <i>G.</i> euter, <i>udder</i> , <i>R.</i> utroba. [an. |
| Unitus, | Anwita, 1, | joined, | εις, <i>Go.</i> ains, <i>G.</i> einer, <i>one</i> , <i>R.</i> odn, <i>Ga.</i> aon, <i>C.</i> un, <i>S.</i> |
| Urgeo, | Urja, 7, | effort, | εργον, <i>work</i> , <i>urgent</i> , <i>G.</i> werk. |
| Uter, | Yatara, | whether, | <i>G.</i> oder, <i>either</i> , <i>R.</i> ieter, <i>ετερος</i> . |
| Umbra, | Abhram, 10, | cloud, | <i>F.</i> ombre, <i>umbrageous</i> . |
| Ursus, | Riksha, 2, | a bear, | αρκος, <i>apascow</i> , <i>P.</i> khirs, <i>F.</i> ours. |
| Unda, | Uda, 43, | water, | υω, <i>Go.</i> wato, <i>Li.</i> wandu, <i>inundate</i> . |
| Un, | An, 217, | not, | αν, <i>Go.</i> un, <i>Ga.</i> an <i>C.</i> an, <i>aven</i> , <i>G.</i> ohne, <i>L.</i> in, <i>R.</i> wnie. |
| Urina, | Vári, 40, | water, | ουρον, <i>urinal</i> . |
| Utor, | Yat, 8, | persevere, | οθω, <i>use</i> , <i>F.</i> use. [báqaq. |
| Vacuo, | Vich, 20, | separate, | οιχουαι, <i>G.</i> weiche, <i>Go.</i> wiko, <i>F.</i> vague, <i>L.</i> vaco, <i>H.</i> |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|-----------|---|
| Volo, | Vlí, | choose, | ελω, <i>Go.</i> wilia, <i>wil</i> , <i>R.</i> woliu, <i>G.</i> wahle, <i>Li.</i> weliju. |
| Valeo, | Val, 17, | cover, | ελω, <i>wall</i> , <i>L.</i> vallus, <i>G.</i> wohl, <i>C.</i> gwell, <i>R.</i> waliu. |
| Vates, | Bhatta, 33, | a sage, | υδης, <i>φαις</i> , <i>vaticinate</i> , <i>W.</i> barth, <i>Ga.</i> bard, <i>H.</i> parat. |
| Ve, | Vá, | or, | <i>H.</i> vau, <i>ouat</i> . |
| Veho, | Vah, 19, | carry, | οχεω, <i>G.</i> wege, <i>neigh</i> , <i>L.</i> via, <i>Li.</i> wezu, <i>R.</i> wozd, <i>S.</i> weg. |
| Venor, | Van, 1, | honor, | ονημ, <i>Go.</i> unna. [C. gwynt, <i>Go.</i> wind. |
| Ventus, | Váta, | wind, | αηης, <i>G.</i> wind, <i>Li.</i> wejas, <i>P.</i> bad, <i>Ga.</i> gaoth. |
| Verto, | Varta, 20, | turning, | <i>Go.</i> wairda, <i>C.</i> wrth, <i>ward</i> , <i>ερω</i> , <i>R.</i> werzcu. |
| Vestio, | Vastra, 18, | cloth, | <i>G.</i> watte, <i>εσθης</i> , <i>need</i> , <i>Go.</i> wasti, <i>F.</i> veste, <i>vesture</i> . |
| Victus, | Vijitus, 6, | defeated, | <i>Victory</i> , <i>L.</i> victima, <i>F.</i> victoire. |
| Videre, | Vid, 109, | know, | <i>G.</i> weiss, <i>wit</i> , <i>C.</i> wyddus, <i>wizard</i> , <i>ιστωρ</i> , <i>R.</i> wiedee. |
| Vidua, | Vidhava, 2, | widow, | <i>L.</i> viduus, <i>ιδιος</i> , <i>Go.</i> authis, <i>S.</i> weodues, <i>G.</i> óde, <i>P.</i> biwa. |
| Villa, | Palli, 2, | village, | <i>Li.</i> pillis, <i>Ga.</i> baile, <i>F.</i> village, <i>villa</i> . |
| Vico, | Ve, | weave, | <i>Li.</i> weju, <i>τεα</i> , <i>R.</i> wiü. [S. wær, <i>Li.</i> wiras. |
| Vir, | Víra, 35, | hero, | <i>C.</i> wraig, <i>Go.</i> wair, <i>Ga.</i> fear, <i>G.</i> wehren, <i>war</i> , <i>H.</i> gavar, |
| Viridis, | Harita, 20, | green, | <i>L.</i> herba, <i>verdure</i> , <i>χορτος</i> , <i>F.</i> verdure, <i>H.</i> phera. |
| Vita, | Vid, 109, | exist, | <i>βιορν</i> , <i>vital</i> , <i>P.</i> ziad, <i>F.</i> vitement. |
| Vivo, | Jív, 53, | life, | <i>W.</i> byw, <i>Ga.</i> beo, <i>Li.</i> gywas, <i>βιος</i> , <i>revive</i> . |
| Vox, | Vách, 34, | speak, | <i>ηχεω</i> , <i>G.</i> wasche, <i>F.</i> voix, <i>R.</i> weiszczaiu, <i>invoke</i> . |
| Verres, | Varáha, 5, | boar, | <i>ερωωος</i> , <i>S.</i> bar, <i>R.</i> barov, <i>A.</i> varaz <i>P.</i> baret. |
| Vado, | Pad, | foot, | <i>πατεω</i> , <i>wade</i> , <i>οδινω</i> , <i>Go.</i> itho, <i>G.</i> wate. |
| Vello, | Vil, 1, | divide, | <i>ελω</i> , <i>Go.</i> wilwa, <i>revulsion</i> . |

| LATIN. | SANSKRIT. | MEANING. | COGNATES. |
|-------------|--------------|------------|--|
| Vomitus, | Vámīta, 7, | vomit, | εμεω, <i>Li.</i> wemia, <i>H.</i> phum, <i>emetic.</i> |
| Vesper, | Váspa, 8, | vapor, | εσπερος, <i>vespers</i> , <i>R.</i> vetcher, <i>F.</i> vesperie. |
| Versus, | Vñtta, | verse, | <i>Go.</i> wairtha, <i>reverse</i> , <i>L.</i> verto, <i>S.</i> færs. |
| Vetus, | Víta, 14, | gone, | <i>R.</i> wetchü, <i>F.</i> vieux, <i>inveterate</i> , ερος, <i>Ga.</i> eata, <i>L.</i> ætas. |
| Vigil, | Vij, 2, | active, | υγιανω, <i>L.</i> veges, <i>Go.</i> waka, <i>G.</i> wache, <i>wake.</i> |
| Verus, | Varyas, 2, | excellent, | <i>Li.</i> wiernas, <i>Ga.</i> fearr, <i>G.</i> wahr, <i>R.</i> wierny, <i>C.</i> gwür, <i>verity.</i> |
| Vorax, | Vřika, 8, | take, | <i>Worry</i> , <i>Li.</i> wilkas, <i>G.</i> würge, <i>H.</i> bagyar, <i>βopa</i> , <i>S.</i> worigeh. |
| Vereor, | Var, | select, | εραω, <i>Go.</i> veria, <i>G.</i> ehre, <i>R.</i> wieriü, <i>reverence.</i> |
| Vario, | Varn.a, 49, | color, | <i>Variety</i> , <i>F.</i> variant. |
| Vitulus, 7, | Vatsa, 17, | calf, | ιταλος. |
| Vasto, | Vast, 3, | injure, | <i>Waste</i> , αταω, <i>G.</i> wüste, <i>F.</i> devasté. |
| Vagio, | Vásh, 2, | cry, | <i>H.</i> bekeh. |
| Vicus, | Vish, | dwel, | οικος, <i>Go.</i> weihš, <i>Li.</i> wissas, <i>vicinity.</i> |
| Vago, | Vag, | go, | οχεω, <i>L.</i> vacilla, <i>vag</i> , <i>G.</i> wacklen, <i>F.</i> vague. |
| Vulcanus, | Ulká, 4, | fire, | <i>Volcano</i> , αλαε, |
| Vicis, | Vich, 2, | interval, | <i>Go.</i> wio, <i>G.</i> woche, <i>R.</i> wick, <i>vicissitude.</i> [virtuel. |
| Virtus, | Vřitya, | excellent, | αρετη, <i>G.</i> werth, <i>Go.</i> wairtha, <i>Ga.</i> fearr, <i>virtuous</i> , <i>F.</i> |
| Vanus, | U'na, | less, | ενυς, <i>Go.</i> wans, <i>G.</i> wahn, <i>Li.</i> wiernas, <i>avēu</i> , <i>vanity.</i> |
| Viginti, | Vinshati, 3, | twentieth, | <i>G.</i> zwanzig, <i>R.</i> dwadesiat, <i>Ga.</i> fchid, <i>C.</i> ugain. |
| Virgo, | Vírá, | woman, | <i>Li.</i> wyrene, <i>C.</i> wraig, <i>virgin</i> , <i>F.</i> virginal. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|---------------|------------------|---|
| Ax, | Ashri, | edge of a sword, | ακις, <i>L. acus</i> , <i>G. axt</i> , οξυς, <i>S. acoe</i> , <i>Li. ascia</i> . |
| Alley, | A'vali, | row, | <i>F. allée</i> . |
| Another, | Anyatara, 28, | other, | <i>C. allan</i> , αλλος, <i>G. ander</i> , <i>Li. anas</i> , εννεος, <i>G. hinter</i> . |
| Ape, | Kapi, | monkey, | <i>P. kappi</i> , <i>G. affe</i> . |
| Arrow, | Shara, | arrow, | <i>S. arrene</i> . |
| Away, | Ava, | from, | ου, <i>L. ve</i> , <i>R. wy</i> , ουχι, εμυ. |
| Ache, | Agha, 5, | pain, | αχος, <i>G. ach</i> , <i>C. oeh</i> , <i>S. ace</i> . |
| Bake, | Pakwa, | cooked, | βεκκος, <i>P. pazad</i> , <i>Ga. bacalta</i> . |
| Bask, | Bhaskara, | the sun, | <i>G. backen</i> . |
| Bath, | Vád, 4, | bathe, | <i>S. bad</i> , βαπτω, <i>Ga. baidh</i> , <i>R. banya</i> . [bio. |
| Be, | Bhú, 127, | exist, | φυω, <i>W. bu</i> , <i>Ga. bu</i> , <i>P. buden</i> , <i>R. bywain</i> , <i>C. bun</i> , <i>S.</i> |
| Beg, | Bhikshá, 17, | begging, | πτωχος, <i>L. posco</i> , <i>Li. bedzius</i> , <i>R. ubogü</i> . |
| Better, | Bhadra, 22, | excellent, | <i>Go. bats</i> , <i>G. besser</i> , <i>P. bahtar</i> , <i>S. betre</i> . |
| Bid, | Vad, 2, | speak, | <i>L. peto</i> , <i>Go. bidia</i> , <i>S. biddan</i> , <i>Ga. bita</i> , <i>W. gwed</i> . |
| Booty, | Bhata, | soldier, | βιαζω, <i>F. butin</i> , <i>G. beute</i> .* |
| Bold, | Vala, 5, | army, | <i>L. polleo</i> , <i>G. bald</i> . |
| Bray, | Brú, | speak, | βρωω, <i>L. burrio</i> , <i>G. brause</i> , <i>F. bruís</i> . |
| Brother, | Bhrátri, | brother, | φρατηρ, <i>L. frater</i> , <i>S. broder</i> , βρωω, <i>G. bruder</i> . |
| Brow, | Bhrú, | eyebrow, | οφρυς, <i>S. browa</i> , <i>Ga. bruach</i> . |
| Bald, | Palit, | grey-haired, | πολιος, <i>L. palleo</i> , <i>Li. baltas</i> , <i>R. bielyi</i> . |
| Bit, | Bhid, | split, | <i>Bait</i> , φαζω, <i>L. fodio</i> , <i>G. beisse</i> , <i>F. fends</i> , <i>A. bit</i> , <i>S. bita</i> . |
| Bend, | Bhugna, | bowed, | <i>L. pandus</i> , <i>S. bendan</i> , <i>P. bandan</i> . |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|-------------------|---|
| Bride, | Bhárjyá, | wife, | παρθη, <i>L.</i> parta, <i>Go.</i> braths, <i>G.</i> braut, <i>F.</i> bru. |
| Bind, | Bandha, 25, | fasten, | πέδαω, <i>F.</i> pedio, <i>Go.</i> bandi, <i>G.</i> binde, <i>P.</i> bandah, <i>H.</i> abhnet. [eddu. |
| Beat, | Bádha 7, | oppose, | πατεω, βακτρον, <i>L.</i> batuo, <i>Li.</i> badau, <i>R.</i> bodu, <i>C.</i> ba- |
| Buck, | Bukka, | goat, | βηκον, <i>G.</i> bock, <i>C.</i> bwch, <i>buck</i> , <i>F.</i> bouc. |
| Bleat, | Valh, | speak, | βληχαω, <i>L.</i> balo, <i>G.</i> blöke, <i>Li.</i> blauju, <i>R.</i> bleiu. |
| Bow, | Bhuj, 33, | bend, | πτυσσω, <i>C.</i> bachu, πνζ, <i>G.</i> bogen, <i>Go.</i> biuga. |
| Break, | Bhrash, | fall, | <i>L.</i> frango, <i>Go.</i> brika, <i>G.</i> breche, πριζω. |
| Blaze, | Bhlásh, | shine, | <i>L.</i> fulgeo, φλέζω, <i>Li.</i> blizgu, <i>S.</i> blase. [bada. |
| Bad, | Vádha, | give pain, | <i>L.</i> pestis, <i>G.</i> bös, <i>Li.</i> beda, <i>R.</i> bies, <i>F.</i> pis, <i>S.</i> beado, <i>P.</i> |
| Blow, | Phull, | flower, | <i>G.</i> bhühe, φλαω, <i>L.</i> flo. |
| Bang, | Bhanj, | break, | <i>Go.</i> brikan. |
| Carve, | Charv, | eat, | <i>L.</i> carpo, καρπιζω, <i>G.</i> kerbeen, <i>Li.</i> kerpu. |
| Caw, | Káváda, | indistinct sound, | χαω. |
| Champ, | Cham, | eat, | καπτω, <i>F.</i> champayer. |
| Chant, | Gána, | song, | <i>L.</i> cantus, <i>accent</i> , <i>C.</i> canu, <i>Ga.</i> canam, <i>W.</i> kan. |
| Churn, | Chúrna 15, | grind, | γυρωμα, <i>S.</i> cerene. |
| Coal, | Kála, 86, | black, | <i>L.</i> caleo, <i>G.</i> kohle, <i>S.</i> col, <i>H.</i> gachel, <i>La.</i> gual, <i>R.</i> ugol. |
| Come, | Gam, 18, | go, | κομεω, <i>Go.</i> quima, <i>G.</i> komme. |
| Coo, | Ku, 1, | cry as a bird, | |
| Cottage, | Kuti, 24, | house, | <i>L.</i> casa, hut, <i>C.</i> cwt, κοιτη, κευθω, <i>Ga.</i> cot. |
| Cow, | Gao, 112, | cow, | <i>G.</i> kuh, <i>L.</i> cerva, <i>P.</i> gav, <i>S.</i> cu, <i>H.</i> gagyah, <i>Ga.</i> ceo. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|---------------|---|
| Crow, | Karata, | crow, | κοραζ, <i>L. corvus</i> , <i>G. krähe</i> <i>R. gracz</i> . |
| Cud, | Kḍu, | eat, | <i>S. cud</i> , <i>chered</i> . |
| Chin, | Hanu, 5, | jaw, | γενυς, <i>G. kinn</i> , <i>Go. kinnus</i> , <i>P. chánah</i> . |
| Carry, | Char, 24, | go, | <i>L. curro</i> , <i>χωρεω</i> , <i>chair</i> , <i>S. cyran</i> , <i>car</i> . |
| Chalice, | Kalasha, | water jar, | κυλιζ, <i>L. calix</i> , <i>F. calice</i> , <i>S. calie</i> . |
| Curl, | Kurula, | lock of hair, | γυρος, <i>S. eyrran</i> . |
| Comely, | Komala, 3, | beautiful, | κοσμος, <i>L. comis</i> , <i>S. cweman</i> . |
| Cull, | Khal, | gather, | <i>F. cueillir</i> , <i>collect</i> , <i>λεγω</i> . |
| Cheat, | Cháta, 4, | rogue, | <i>F. acheter</i> , <i>S. cetta</i> . |
| Cool, | Jala, | cold, | <i>L. gelu</i> , <i>G. kalt</i> , <i>L. szaltas</i> , <i>chill</i> , <i>F. gele</i> , <i>R. cholozu</i> . |
| Cut, | Kvit, 4, | cut, | <i>L. quatio</i> , <i>G. kutte</i> , <i>C. cadu</i> , <i>R. kroiu</i> , <i>Li. kertu</i> , <i>card</i> . |
| Cough, | Kása, 6, | cough, | κοιζω, <i>G. keiche</i> , <i>Li. kostu</i> , <i>R. kaszliau</i> . |
| Chuckle, | Kakkh, 2, | laugh, | καχαζω, <i>L. cachinnor</i> , <i>G. kichele</i> , <i>R. chikaiu</i> . |
| Cry, | Kur, | sound, | <i>G. krähen</i> , <i>C. criu</i> , <i>L. queror</i> , <i>καρνω</i> , <i>F. erie</i> . |
| Carp, | Krip, | weak, | <i>L. carpo</i> , <i>G. kerbe</i> , <i>καρπιζω</i> . |
| Chop, | Chap, 2, | pound, | κοπτω, <i>G. kappe</i> , <i>F. coupe</i> , <i>Li. kapoiu</i> , <i>R. kopaiu</i> . |
| Camel, | Kramela, | camel, | καμηλος, <i>G. kamel</i> , <i>L. camelus</i> , <i>F. chameau</i> , <i>H. gámál</i> . |
| Cock, | Kukkuta, 2, | cock, | <i>C. cok</i> , <i>κιρκος</i> , <i>G. göekel</i> , <i>R. koczet</i> . |
| Cuckoo, | Kökila, 4, | euckoo, | κοκκυζ, <i>G. guckuck</i> , <i>L. cuculus</i> , <i>R. kokuska</i> . |
| Claw, | Kuli, | hand, | χηλη, <i>G. klaue</i> . |
| Censor, | Dhwans, 6, | calumniate, | <i>G. sinne</i> , <i>κηνσος</i> , <i>censure</i> , <i>H. kásas</i> . |
| Cup, | Kúpi, 3, | bottle, | κυφος, <i>G. kufe</i> , <i>C. cib</i> , <i>L. cymba</i> , <i>coop</i> , <i>R. kub</i> . |
| Char, | Chur, | burn, | ζηρος. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|-----------|-------------|-------------|--|
| Dame, | Dam, | wife, | δαμαρ, <i>L.</i> domina, <i>F.</i> dame. |
| Dale, | Dal, | division, | <i>G.</i> theile, <i>R.</i> dieliu, <i>Li.</i> dallyiu, <i>Go.</i> dailia. |
| Damp, | Dhúma, 22, | smoke, | θυμος, <i>G.</i> dampf, <i>Li.</i> dussa, τυφος. |
| Dare, | Dhrish, 11, | confident, | <i>Go.</i> dar, <i>G.</i> traue, <i>Li.</i> drystus, <i>R.</i> derzai. |
| Daughter, | Duhitri, 2, | daughter, | θυγατηρ, <i>Li.</i> dukti, <i>P.</i> dokhter, <i>G.</i> tochter, <i>R.</i> docza. |
| Dead, | Tud, | kill, | θανω, <i>Go.</i> dauths, <i>G.</i> todt, <i>Ga.</i> todhas, <i>R.</i> dad, <i>S.</i> dydan. |
| Deal, | Dal, 25, | divide, | θλαω, <i>G.</i> theil, <i>Li.</i> dalis, <i>C.</i> tylla, <i>dole</i> , <i>S.</i> dælan, <i>Ga.</i> dailim, <i>H.</i> dal. |
| Doubt, | Dwaidha, | two ways, | <i>L.</i> dubius, <i>F.</i> doubte, <i>Ga.</i> dubhátai. |
| Drive, | Tarv, | move, | τρεπω, <i>L.</i> trepido, <i>Go.</i> drieba, <i>G.</i> treibe. |
| Dug, | Dugdha, 13, | milk, | <i>C.</i> degga. |
| Dupe, | Dambha, | deceit, | <i>F.</i> dupe. |
| Dust, | Tústa, | dust, | <i>S.</i> dust, <i>Ga.</i> duust. |
| Daunt, | Dánta, 2, | subjection, | <i>F.</i> dompter, <i>L.</i> domitare, δειματοω. |
| Dash, | Dásh, | hurt, | δαζομαι, <i>H.</i> dush. |
| Dim, | Tamas, 30, | darkness, | <i>G.</i> dämmere, <i>L.</i> tenebræ, <i>S.</i> dim, <i>P.</i> damah, <i>Ga.</i> deimhe, [<i>R.</i> dium. |
| Druid, | Dhíra, 14, | wise, | <i>S.</i> drua, <i>Ga.</i> druith. |
| Dip, | Tip, | sprinkle, | δυπω, <i>G.</i> taufe, <i>S.</i> dippan, <i>dive</i> , <i>R.</i> topnu, <i>dip</i> . |
| Dad, | Táta, 5, | father, | <i>C.</i> tád, <i>W.</i> tát, τετρα, <i>L.</i> tata, <i>L.</i> tewas, <i>R.</i> tiaia, [<i>H.</i> dod. |
| End, | Anta, 37, | final, | <i>G.</i> ende, <i>Go.</i> andeis, <i>S.</i> ende. |
| Ewe, | Avi, 2, | sheep, | <i>L.</i> ovis, óis, <i>Ga.</i> avi, <i>R.</i> ovtisa, <i>oration</i> , <i>S.</i> eowa [<i>oculus</i> . |
| Eye, | Akshi, 10, | eye, | <i>G.</i> auge, <i>C.</i> aug, <i>Go.</i> augo, <i>R.</i> oko, <i>S.</i> eage, αυγη, <i>L.</i> |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|---------------|-----------------|--|
| East, | U'shá, 42, | daybreak, | εως, S. east, Ga. heos, G. ost. |
| Even, | Iva, | even, | G. ebung, Ga. e, yea, R. ei, G. ja, L. jam, Go. ja |
| First, | Purastát, | before, | περιστος. |
| Five, | Panchan, 100, | five, | S. fif. L. pente, P. punge, R. pyate, C. pump. |
| Flee, | Paláy, 20, | retreat, | G. fliehen, πλεω. |
| Flood, | Pluta, | plunge, | πλωτος, G. flüss, Ga. fluuch, R. plywre, Li. plauju. |
| Foal, | Pál, | cherish, | πωλος, Go. fula, S. fula. |
| Foot, | Pad, 106, | foot, | ποταω, S. fot, Ga. fuidh, G. pfote. |
| Feud, | Yudh, 17, | war, | S. fedh, foe. |
| Far, | Pára, | end, | πορω, S. feor, Ga. fatt. |
| Fan, | Váyu, | wind, | L. vannus, winnow, R. vieyanis |
| Fell, | Phal, 1, | split, | βαλλω, G. fellen, H. yipel. |
| Find, | Vind, 1, | find, | S. findan, G. befinden. |
| Foam, | Phena, 11, | froth, | S. fam, L. fumus, θειν. |
| Gad, | Gata, | gone, | κτω, L. cio, Go. ganga, G. geh. |
| Glad, | Hlád, 3, | delight, | χλω, G. geil, P. shed, L. hilaro, S. glæd. |
| Glout, | Gláyat, | exhausted, | Glee, S. gligge. |
| Gloom, | Gláni, | languor, | S. glomang, L. lumen. |
| Gó, | Gá, | go, | κτω, Go. ganga, L. cio, G. gehe, R. chozu, W. camu. |
| Greedy, | Gridh, 6, | desire eagerly, | χρω, L. quero, G. gehre, Go. gredo, Li. gardus. |
| Grave, | Gaurava, 23, | heavy, | L. gravis, F. grave, R. pogebræue. [gripper. |
| Gripe, | Grah, 78, | seize, | γρω, G. gréifen, P. géristen, Go. gréipan, S. gripon, F. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|--------------|-------------|---|
| Grunt, | Garjana, 8, | deep sound, | <i>L.</i> grunio, <i>S.</i> grennian. |
| Gullet, | Gala, 11, | throat, | <i>L.</i> collum, <i>G.</i> kehle, <i>L.</i> gula, <i>P.</i> galu, <i>R.</i> glotaiu. |
| Graze, | Gras, | eat, | <i>γρᾶω</i> , <i>Li.</i> grauzu, <i>R.</i> gryzu, <i>S.</i> graşian, <i>G.</i> gras, <i>P.</i> gryah. |
| Gush, | Ghas, | sprinkle, | <i>χρῶσαι</i> , <i>G.</i> giessen, <i>H.</i> gásh. |
| God, | Shudh, 18, | pure, | <i>κασθεύς</i> , <i>L.</i> castus, <i>S.</i> god, <i>G.</i> gott. |
| Glow, | Jwal, 14, | burning, | <i>κηλωω</i> , <i>G.</i> glühe, <i>Li.</i> szylu, <i>R.</i> kalu, <i>F.</i> chaleur. |
| Gorge, | Krika, 8, | throat, | <i>L.</i> gorges, <i>γαργαρεων</i> , <i>gurgle</i> , <i>G.</i> gurgel, <i>R.</i> gorlo. |
| Gate, | Ghatṭa, | ghat, | <i>Go.</i> gatwo, <i>G.</i> gasse, <i>R.</i> chod. |
| Great, | Kṛita, | sufficient, | <i>G.</i> gross, <i>S.</i> great. |
| Grist, | Ghrishṭa, 4, | ground, | <i>S.</i> grist. |
| Hall, | Shálá, 9, | hall, | <i>αυλη</i> , <i>L.</i> cella, <i>κολεος</i> , <i>G.</i> halle, <i>hull</i> , <i>R.</i> kelia, <i>R.</i> [zala. |
| Have, | A'p, 8, | obtain, | <i>απτω</i> , <i>L.</i> apiscor, <i>G.</i> haben, <i>S.</i> habban. [criodhe. |
| Heart, | Hrid, 27, | heart, | <i>Go.</i> hairto, <i>G.</i> herz, <i>Li.</i> szirdis, <i>καρδια</i> , <i>R.</i> serdce, <i>Ga.</i> |
| Hie, | Hay, 1, | move, | <i>κιω</i> , <i>L.</i> eo, <i>S.</i> hiegan. |
| Ho, | Há, | ha, | <i>L.</i> eho. [W. osw, Z. aspo. |
| Horse, | Ashwa, 50, | horse, | <i>Ga.</i> each, <i>P.</i> asb, <i>G.</i> ross, <i>Li.</i> azwa, <i>ικκος</i> , <i>F.</i> hacque, |
| Hurt, | Ardati, 1, | pain, | <i>F.</i> heurter, <i>S.</i> hyrt. [hus, <i>P.</i> kad. |
| Hut, | Kut, 1, | house, | <i>κενθος</i> , <i>G.</i> hütte, <i>R.</i> kutain, <i>C.</i> cuddiu, <i>L.</i> casa, <i>Go.</i> |
| Hit, | Hata, 54, | struck, | <i>L.</i> ictus, <i>Go.</i> hintha, <i>κεντεω</i> . |
| Heat, | Iddha, 3, | blazing, | <i>αιθος</i> , <i>G.</i> heiss, <i>L.</i> æstus, <i>Ga.</i> aodh, <i>C.</i> etc. |
| Hide, | Kudi, 35, | body, | <i>L.</i> cutis, <i>σκυτος</i> , <i>G.</i> haut, <i>coat</i> . |
| Hiss, | Hása, 8, | laughter, | <i>σιζω</i> , <i>S.</i> hircean. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES |
|-----------|--------------|------------|--|
| Harry, | Hri, 7, | seize, | F. harer, S. hergian. |
| Hate, | Hatha, 4, | violence, | κοτεωv, G. hassend, Go. hatands, F. hais, a77, S. ade. |
| Horn, | Shringa, 10, | horn, | κορωνη, L. cornu, Go. hauru, G. horn, H. qeren. |
| Hand, | Hasta, 11, | hand, | G. hand, Go. handus, P. dast, G. tasten, |
| Hilarity, | Hil, 1, | dally, | χαλω, ιλαρος, L. hilaris. |
| In, | Ni, | within, | εν, L. in, Go. in, G. in, Li. i, C. yn. |
| It, | Etad, | it, | L. id. |
| Joke, | Jaksh, | laugh, | ιαχω, G. juchze, Li. jukin, L. jocor, F. joue, H. tsáchak. |
| Jabber, | Jap, 14, | mutter, | Gibberish, P. ghab, S. gabban. |
| Joy, | Jush, 5, | pleasure, | γηθος, L. gaudeo, Go. kiusa, F. gai, H. tsáhal. |
| Keep, | Gup, 35, | hide, | σκειπω, cap, L. capio, G. hebe, Li. kaupoiu, R. kopliu. |
| Kiss, | Kush, | embrace, | κυω, Go. kukia, W. cusanu, G. küss. |
| Knit, | Nah, | bind, | νεω, L. nodus, net, C. neut, R. nit, G. naht, S. gnittan. |
| Kin, | Jana, 95, | mankind, | Go. kuni, Li. gymis, kind. |
| Lazy, | Alasa, 4, | idle, | χαλαζω, L. laxus. |
| Less, | •Leshi, 5, | lessen, | λιαζω, lose, Go. liusa, G. letz, R. liszaiu, Li. liekmi. |
| Lick, | Lih, 6, | lick, | λαιχω, L. lingo, Go. laigo, G. lecke, Li. lezu, R. lizu, |
| | | | Ga. lighau. |
| Light, | Laghu, | light, | Go. laika, L. leger, G. leicht, R. letaiu. |
| Lock, | Lagna, | joined to, | S. loc. |
| Look, | Lok, 9, | see, | λευσσω, W. lhygad. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|--------------|-------------|--|
| Lop, | Lup, 20, | cut, | <i>Li. luppū, λεπτος, λωβη, R. lupliu. [P. laheb.</i> |
| Love, | Lubb, 7, | desire, | <i>G. liebe, S. luvian, R. liubliu, Go. liebia, Li. lubiju,</i> |
| Luck, | Lakshmī, | fortune, | <i>λευκος, G. glücke, lucky.</i> |
| Lust, | Lása, | embrace, | <i>λαυω, L. lætor, Go. lusto, G. lüste, S. lust, P. lustan.</i> |
| Leaven, | Lavana, 4, | salt, | <i>F. levain, leaven.</i> |
| Loll, | Lal, 41, | desire, | <i>λιλαω. [loose.</i> |
| Loose, | Lush, 9, | cut, | <i>λειωω, L. laxo, Go. lausia, Li. lauzu, R. lozzu, G. löse,</i> |
| Leap, | Lep, | approach, | <i>G. laufe, Go. laupa.</i> |
| Lake, | Luch, 11, | cut, | <i>L. lacus, G. loch, C. llwch, R. luza, lough, F. lac.</i> |
| Like, | Lak, 1, | mark, | <i>Go. leiks, like, λίκος, G. lich, Li. lygus.</i> |
| Mad, | Mad, 67, | fool, | <i>ματια, G. matte. [meshe.</i> |
| Man, | Mánusha, 11, | man, | <i>C. mon, L. mas, G. mensch, R. muz, Go. manna, Z.</i> |
| Mead, | Madhu, 32, | intoxicate, | <i>μεθυ, metheglin, W. medh, G. meth, C. medd.</i> |
| Meal, | Mil, | mix, | <i>ομιλια, S. male, R. melia.</i> |
| Mean, | Man, | mind, | <i>μενοιαω, G. meinen, Ga. mien, R. mniū, A. manwi.</i> |
| Month, | Mása, 11, | month, | <i>μην, Ga. mios, R. miesiac, Li. menu, G. monath.</i> |
| More, | Mahattara, | greater, | <i>S. mare, L. major, Ga. mor, Z. mae, A. emir, W. mawr.</i> |
| MurRAIN, | Marana, 2, | dying, | <i>μαραινω, L. mori.</i> |
| Mud, | Mrid, | soil, | <i>μυδαω.</i> |
| Matter, | Mátrá, 2, | substance, | <i>L. materia, F. materiel.</i> |
| Maid, | Mahilá, | female, | <i>Go. maevi, G. magd.</i> |
| Member, | Marman, 5, | joint, | <i>μερος, F. membre.</i> |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|------------|------------|---|
| Mouth, | Mukh, 36, | mouth, | G. mund, <i>Go.</i> muntshs, <i>F.</i> museau, <i>μυτις</i> , <i>S.</i> median. |
| Mark, | Maryá, 1, | limit, | <i>Go.</i> marka, <i>G.</i> mark, <i>Li.</i> miera, <i>C.</i> marc, <i>R.</i> miera, <i>μερος</i> . [meliu. |
| Mill, | Malana, | grinding, | <i>μυλη</i> , <i>L.</i> mola, <i>G.</i> mühle, <i>Ga.</i> muileann, <i>C.</i> melin, <i>R.</i> |
| March, | March, | go, | <i>G.</i> marschirn, <i>F.</i> marcher. [S. mylen. |
| Male, | Mála, 1, | man, | <i>L.</i> masculus, <i>F.</i> masculin. |
| Mate, | Mith, | associate, | <i>Meet</i> , <i>μετα</i> . |
| Nail, | Nakha, 27, | nail, | <i>onyx</i> , <i>G.</i> nagel, <i>Li.</i> nagas, <i>P.</i> nakhan, <i>L.</i> unguis, <i>R.</i> nogot. |
| Naked, | Nagna, 9, | naked, | <i>L.</i> nudus, <i>Li.</i> nogas, <i>Go.</i> naquaths, <i>G.</i> nacket, <i>R.</i> nagü. |
| Neat, | Nad, 1, | shine, | <i>Go.</i> nasia, <i>L.</i> niteo, <i>G.</i> nett, <i>F.</i> net. [dus, <i>C.</i> nes. |
| Nigh, | Nah, 2, | join, | <i>G.</i> nach, <i>Go.</i> nehwa, <i>C.</i> nessu, <i>L.</i> nexus, <i>νηθω</i> , <i>L.</i> no- |
| No, | Ná, 11, | not, | <i>W.</i> na. <i>νη</i> , <i>L.</i> ne, <i>G.</i> nein, <i>Li.</i> ne, <i>Ga.</i> nach, <i>G.</i> nicht, <i>P.</i> nah, <i>R.</i> ne, <i>S.</i> no. |
| Nor, | Nir, 281, | no, | |
| Nose, | Násá, | nose, | <i>G.</i> nase, <i>Li.</i> nosis, <i>R.</i> nos, <i>S.</i> nese. |
| Now, | Nu, | now, | <i>L.</i> nunc. <i>Go.</i> nu, <i>Ga.</i> nois, <i>νυν</i> , <i>R.</i> nynie, <i>P.</i> nun, <i>S.</i> nu. |
| Nod, | Nata, | shake, | <i>κνωσσω</i> , <i>νευω</i> , <i>L.</i> nuto, <i>W.</i> amneidis. |
| Nave, | Nábhi, | wheel, | <i>ομφαλος</i> , <i>G.</i> umbo, <i>G.</i> nabe., [S. nafal. |
| Neath, | Nícha, | low, | <i>G.</i> nieder, <i>Li.</i> nú, <i>R.</i> niz. |
| Navel, | Nábhila, | navel, | <i>G.</i> nabel, <i>ομφαλος</i> , <i>F.</i> nombril, <i>L.</i> umbelicus, <i>P.</i> naf, |
| Nest, | Nída, 2, | nest, | <i>Ga.</i> nead, <i>C.</i> nith, <i>ναος</i> , <i>G.</i> nest. |
| Oar, | Arittra, | rudder, | <i>S.</i> are, <i>L.</i> aro. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|--------------|-----------------|---|
| Oh, | Háh, 5, | O! | O. |
| One, | Jana, 95, | person, | οιον, <i>L.</i> unus, <i>unity</i> , <i>F.</i> un. |
| Ooze, | Ghas, | sprinkle, | <i>F.</i> eaux, <i>S.</i> wæz. <i>H.</i> auts. |
| Other, | Itara, | other, | <i>S.</i> oder, <i>F.</i> autre, <i>L.</i> alter, <i>H.</i> âdar. ετερος. |
| Otter, | Uda, | water, | <i>S.</i> oter, <i>L.</i> lutra. |
| Over, | Upari, 5, | above, | <i>L.</i> super, <i>Go.</i> ufar, <i>H.</i> ávar., |
| Owl, | Ulúka, | owl, | <i>L.</i> ulula, ολολυνγων, <i>G.</i> eule, <i>horel.</i> |
| Ox, | Ukshan, 2, | ox, | <i>W.</i> ych. <i>Ga.</i> agh, <i>L.</i> vacca, <i>Co.</i> aulis, <i>G.</i> ochs <i>S.</i> oxa. |
| Opium, | Aphena, | opium, | οπιον, <i>P.</i> afun, οπος. |
| Outer, | Uttar, 66, | posterior, | <i>S.</i> ut, ωθεω. |
| Pass, | Pes, | move, | πεταω, <i>F.</i> passer, <i>L.</i> passus. |
| Plunge, | Plu, | submerge, | πλυνειν, <i>F.</i> plonger. |
| Prayer, | Prárhana, | asking, | φραστωρ, <i>F.</i> precor, <i>G.</i> sprechen, <i>R.</i> pröszu, <i>Li.</i> praszau. |
| Proud, | Pradhrishta, | arrogant, | <i>S.</i> prude. |
| Pot, | Putá, 7, | vessel, | ποτος, <i>pollage.</i> |
| Push, | Push, 1, | rear, | <i>F.</i> pousser. |
| Pretty, | Príta, 11, | satisfied with, | <i>L.</i> fruor, <i>S.</i> præd. |
| Paw, | Paní, | the hand, | <i>L.</i> puto, <i>W.</i> pawen. [S. pœth, <i>P.</i> pay. |
| Path, | Pathin, 9, | road, | <i>L.</i> spatium, πατος, <i>G.</i> pfad, <i>R.</i> put, <i>F.</i> pas, <i>L.</i> passus, |
| Pile, | Pul, | heap up | πλεω, <i>Li.</i> pillu, <i>F.</i> pile. |
| Pawn, | Pana, 13, | bet, | ποινη, <i>L.</i> pensum, <i>G.</i> pfand, <i>Li.</i> pantas. |
| Pound, | Pund, | gtind, | <i>L.</i> pinso, <i>Li.</i> paisau, πτισσω. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|------------|-------------------|--|
| Swell, | Sphul, | expand, | S. svellan. |
| Sir, | Sri, 52, | respect, | F. sire, L. senior. |
| Sun, | Súnu, | sun, | G. sonne, Go. sunna, R. solnce, C. huan. |
| Shrub, | Suráp, | drinking spirits, | L. sorbeo, A. sariba. ποφew. |
| Smile, | Smi, 3, | smile, | G. schmiele, R. smieu, μειδαω. |
| Scathe, | Skhad, 2, | destroy, | σκειδαω, G. shade, Go. skathia, Li. skaustu. |
| Snow, | Snay, 2, | oozing, | Go. snaiwa, G. schnee, Li. snegas, Ga. sneachd, R. snieg, vič, L. nix. |
| Sow, | ShLkara, | hog | суи, L. sus, G. sãu, R. swinia, W. hweh. |
| Stow, | Styai, | crowd, | G. staue, στυω. |
| Seed, | Súti, 7, | bringing forth, | Go. setho, G. saat, C. had, σειω, Li. seju. |
| Shell, | Chála, | thatch, | G. schale, shield, σκυλος. |
| Steer, | Sthira, | bull, | G. stier, Go. stiurs, ταυρος. |
| Skill, | Shila, | versed in, | L. calleo, W. call, σχολη. |
| Steam, | Stema, | moisture, | ατμη, S. steme. |
| Star, | Tará, | star, | L. stella, Go. stairno, W. seren, G. stern, P. sitarah, S. [steorra. |
| Tear, | Drí, | pull, | τερην, L. tener, S. tœran, P. tarakidan, R. deri. |
| Teat, | Dayita, | beloved, | τιρθος, W. teth, S. tit, F. teton. |
| That, | Tad, 40, | it, | G. das, το Ga. so, H. so. |
| Thirst, | Trish, 11, | thirst, | τερσια, G. durst, Li. trokstu, P. tarzad, L. torres. |
| Thou, | Twam, | thou, | Ga. tu, R. ty, G. du, C. ti, P. tu, σν, Li. tu, τν, Go. thu. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|------------|-------------|--|
| Toss, | Tas, | throw, | ταζω, <i>F.</i> tasser, <i>θεωσαι</i> . |
| T'other, | Tatara, | the other, | |
| Tree, | Taru, 20, | tree, | δρυς, <i>Go.</i> triu, <i>R.</i> drewo, <i>Ga.</i> dofre, <i>C.</i> dar. |
| Through, | Tri, | pass, | <i>G.</i> durch, <i>S.</i> durr. |
| True, | Dhruva, 3, | fixed, | δηρος, <i>Go.</i> trigws, <i>G.</i> treu, <i>L.</i> durus, <i>G.</i> daure, <i>C.</i> tariu. |
| Tune, | Tána, | tune, | <i>G.</i> töne, <i>din</i> , <i>L.</i> tonus, <i>C.</i> ton, <i>δονεω</i> . |
| Touch, | Twach, 8, | cover, | θιγω, <i>L.</i> ictus. |
| There, | Tatra, | there, | <i>Go.</i> thatro, <i>G.</i> dar, <i>S.</i> dær. |
| Thought, | Dhyáta, 5, | meditate, | <i>G.</i> denke, <i>Go.</i> thankia, <i>Li.</i> dingau. |
| Vane, | Váyu, | wind, | <i>L.</i> vannus. <i>F.</i> vanne. |
| Very, | Bhúri, 6, | much, | επι, <i>F.</i> vrai. |
| Vile, | Vilaksha, | vain state, | φαιλος, <i>F.</i> vil, <i>L.</i> vilis, <i>H.</i> hevel. |
| Upper, | Upari, 4, | above, | <i>Go.</i> ufar, <i>Da.</i> over, <i>Swe.</i> ofre, <i>ψι</i> , <i>G.</i> auf, <i>up</i> , <i>S.</i> uppa. |
| Udder, | Udara, 13, | belly, | ουθαρ, <i>L.</i> uterus, <i>S.</i> uder, <i>L.</i> uber. |
| Was, | Vása, | abiding | <i>G.</i> wesen, <i>S.</i> wesan. |
| Weave, | Vap, 16, | weave, | υψαω, <i>web</i> , <i>G.</i> weben, <i>L.</i> opus, <i>P.</i> bafad, <i>L.</i> vibro. |
| Well, | Válita, | cherish, | ουλων, <i>I.</i> valeo, <i>G.</i> wohl, <i>R.</i> welü, <i>C.</i> gwell. |
| Wed, | Vadhuká, | wife, | εδνα, <i>S.</i> wedian. |
| What, | Yad, 48, | what, | <i>S.</i> hvæt, <i>Go.</i> was, <i>L.</i> quid, <i>H.</i> hua. [<i>waliu</i> , <i>Li.</i> welu. |
| Wheel, | Gola, | circle, | <i>S.</i> hweol, <i>ειλεω</i> , <i>L.</i> volvo, <i>Go.</i> walwia, <i>G.</i> walle, <i>R.</i> |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|-------------|----------------|--|
| Wend, | Vand, 1, | surround, | <i>L.</i> vitta, <i>Go.</i> winda, <i>G.</i> winde, <i>wind.</i> |
| Wing, | Vihanga, | going swiftly, | <i>S.</i> gewing, <i>L.</i> pinna. |
| Wise, | Vidyá, | knowledge | <i>Wit,</i> εἶδω, <i>Go.</i> wait, <i>R.</i> wizu, <i>C.</i> wyddu, <i>Li.</i> wystu. |
| Wish, | Ish, 23, | wish, | <i>G.</i> heische, <i>Li.</i> jeshkau, <i>Go.</i> weiha, <i>P.</i> az. <i>L.</i> egeo, <i>R.</i> iszczu, <i>ask.</i> |
| Woman, | Vamá, 13, | woman, | <i>Go.</i> wamba, <i>Ga.</i> fem, <i>G.</i> wamme, <i>R.</i> wymia, <i>L.</i> femina. |
| Wrath, | Krodha, | anger, | ερίθω. |
| Wound, | Vundh, | hurt, | ovraω, <i>G.</i> wunde, <i>Go.</i> wundo. |
| Wan, | Vána, | dry, | <i>S.</i> wan, <i>wane,</i> Cogwan. |
| Waste, | Vasta, | injure, | araω, <i>L.</i> vasto, <i>G.</i> wúste, <i>waste,</i> <i>H.</i> bázan. |
| Wax, | Vaksh, | accumulate, | aeζω, <i>L.</i> vegeo, <i>Go.</i> wahsia, <i>G.</i> wachse. |
| Warm, | Gharma, 10, | heat, | θερμον, <i>P.</i> garm, <i>S.</i> wyrman, <i>Ga.</i> garam. |
| Wriggle, | Vrijana, | crooked, | <i>S.</i> wriggan. |
| Word, | Vrittam, | read, | <i>L.</i> verbum, <i>Go.</i> waurd, <i>Li.</i> wardas : <i>G.</i> wort. |
| Walk, | Valga, 5, | move, | <i>S.</i> wealcan, <i>G.</i> walzen, ελγω, <i>Li.</i> welku, <i>R.</i> woloku. |
| War, | Vri, 20, | defend, | <i>G.</i> wehre, <i>Go.</i> waria, <i>Li.</i> wyras. |
| Ween, | Ven, | reflect, | οιειν, <i>S.</i> wenan, <i>G.</i> wahren, <i>H.</i> bun. |
| Wash, | Uksh, | clean, | <i>Li.</i> ukstu, υγρος, vakiζω, <i>G.</i> wasche. |
| Wolf, | Vrika, | wolf, | <i>L.</i> vulpes, <i>Li.</i> wilkas, αλωπηξ. |
| Wall, | Val, 13, | cover, | ελαρ, <i>L.</i> vallum, <i>Li.</i> wolus, <i>R.</i> wal, <i>G.</i> wall, <i>F.</i> val. |
| While, | Velá, 2, | time, | <i>Go.</i> weila, <i>G.</i> weile, <i>S.</i> hwile. |
| White, | Shweta, 46, | white, | <i>G.</i> weiss, <i>Go.</i> hweits, καζω, <i>L.</i> castus, <i>P.</i> safid, <i>S.</i> hwit. |

| ENGLISH. | SANSKRIT. | MEANING. | COGNATES. |
|----------|------------|----------------------|---|
| Wagon, | Vahana, 4, | vehicle, | G. wagen, R. wezenie, L. vehiculum. |
| Way, | Vega, 13, | speed, 13, | G. wege, S. wæg, βαω, L. via, voyage, H. boa. |
| Whisk, | Vaska, 3, | motion, 3, | βασκω, G. wischen. |
| Yoke, | Yūgya, 30, | fit to be harnessed, | P. yugh, ζευγος, W. jau, Ga. kuing, S. ioc, R. igo, Go. |
| Young, | Yuvan, | youth, | S. jong, ηθεος. |
| Yea, | Iva, | so, | n, Go. ja, Ga. ja, R. ei, Ga. e, C. efe, F. oui. |



On a new species of Cervus, CERVUS DIMORPHE'. By B. H. HODGSON, Esq. Resident, Kathmandoo. With a Plate.

In January last, I procured from the Saul forest of the Morung, a young Stag rising two years, having horns of an unique character, and a stature and other attributes seeming to place him between the Axines and Rusans. I considered this animal to belong to a new species, but, as he was young and had the horns imperfect, I determined to wait awhile before noticing him to the Society. The animal since his arrival has lived and flourished in my stable. He is now nearly three years old, and his horns are perfect; but his pelage in course of moult or change. I will not, however, longer defer giving you a summary description and sketch of what I apprehend to be an undescribed, though large and handsome species of Deer. This animal, like *Cervus Wallichii*, and *Cervus Elaphoides vel Duvancellii*, possesses a mixed character, so that I hesitate to class it with any known group at present, and shall merely indicate this attribute by assigning to it the trivial name of *Dimorphé*. My specimen has been reared in confinement: yet it approaches the Rusans in size and stature, but retains in youth at least a good deal of the graceful Axine type. Its horns are small, owing to confinement perhaps, and it is possible that maturer age may develope more snags or antlers. At present there is but one on each beam, and it has a very forward direction, as in *Elaphus* and our *Affinis*, species to which the present one is also allied by its short tail and moderate suborbital sinus.

Cervus Dimorphé, Mihi, new. Deer with moderate pale smooth horns, Axine in the general style, but more bent in the middle of the beam, more divergent and possessed of only one basal antler, which is directed very forward; small, or moderate, and vertical suborbital sinuses; interdigital pores; broad spreading ears and short stag-like tail. Stature and aspect mediate between the Axines and Rusans. In youth bright fawn-red, spotted with white; in age nigrescent bay with blackish neck and belly; a dark list round the muzzle, and white chin: limbs pale. Habitat the Saul forest.

Nepal, October, 1843.

Note on the "Flata Limbata," and the White Wax of China. By
Capt. THOMAS HUTTON, B. N. I.

This insect occurs abundantly a little above Rajpore, extending along the jungles at the base of the mountains; the larva is of a pale brown, but this colour is completely hidden beneath a coating of pure white cottony down and powder, with which the whole body is thickly covered; from the tail or anal segment of the abdomen springs a thick tuft or brush of pure white down, which in a state of quiescence, remains horizontally extended posteriorly, but which the insect has the power of erecting and spreading out, so as to cover the whole of its back. These cottony appendages are curled or crisped at the ends, and when erected have precisely the appearance presented by the cut and curly ends of a root of celery when prepared for the table. The larva is furnished, like the perfect insect, with an inflected proboscis; the antennæ are also similar in both, being composed of three joints, of which the two basal ones are thick, strong and cylindrical, the second or middle joint being the longest, and the third or apical joint is a mere seta or bristle. The eyes of the larva are black, and it is from beneath them, and a little anteriorly, that the antennæ spring. The hind pair of legs have three short spines, the others are unarmed; the foot terminates in a double hook; and in these respects also the larva and imago correspond, except that the hind legs in the latter have no spines. The perfect insect is furnished with four wings, the under pair being pure white, and the upper pair or elytra of a beautiful apple green, bordered anteriorly with red; the abdomen is powdered with white cottony down as in the larva, and the last segment is furnished with a thick tuft of the same substance. The larva of this species is abundant on a certain shrub growing in the jungly tracts a little above the base of the mountains; they come forth from the ova in December, clustering round the stems and stalks of the branches and leaves, and even on the back of the leaves themselves. They deposit upon the branches a waxy substance of a pure white colour, in small grains of various sizes, and sometimes the branch becomes thickly encrusted with the substance; it is, however, more especially upon the leaves of the shrub that the wax accumulates, and this is so thickly laid on, and becomes so firm from exposure to the atmosphere, that it may

be pared off with a knife in thick scales or shavings, having very much the appearance of true wax. The taste is sweet, and the scales may, when fresh, be moulded into balls by the fingers. The reason why it accumulates so much on the leaves is simply from their catching the liquid drops which fall from the hundreds of larva clustering around the stems above.

This wax-like substance appears to be the excrement of the larva, and as it falls from them it is caught and collected upon the surface of the leaves, which at first appear to be only slightly sprinkled with moisture, and have a shining appearance like that caused by certain species of aphides. The liquid dropped is at first sticky to the touch, and sweet in taste; the leaves appearing to be thinly bedewed with honey; this gradually accumulates, and as it passes from a liquid to a solid state, appears like a thick coating of wax upon the leaves, but as it dries by exposure to the sun and atmosphere, it hardens into a snowy white brittle substance, giving the tree the appearance of being *white-washed*, or frosted over with white sugar, like the top of a Twelfth Night cake. It then cracks and falls in pieces to the ground, where it soon dissolves from rain and dews, and is lost.

The larva cluster so thickly round the stems of the shrubs which they frequent, as to give them the appearance of being loaded with snow, and the moment the tree is shaken, they spring off with a sudden jerk in all directions; when in motion, they erect the caudal appendage or cottony tail.

Some of the mature insects remain on the trees even after the larva are hatched, and I have taken many both in January and February; the green colour of the elytra had, however, given place to a faded yellow tinge like a withered leaf, and the insects were in a semi-lethargic state.

The larva appears in December or beginning of January, and gradually increases in size until the period of the rains, that is, until the middle of June, when they change to the perfect insect, and no more wax is deposited. This substance increases in quantity as the larva increases in size, but as it readily dissolves in water, it disappears entirely as soon as the rains have set in. The larva shews no rudiments of wings until its last moult, in which stage Donovan has figured the larva of *F. nigricornis*.

The last change being completed, the perfect insect now assumes the place of the larva, and clusters in hundreds around the stems of the same shrubs that nourished it through its immature stages, and instead of the snowy aspect which they formerly wore, the twigs are now, as it were, encircled by small green leaves or fruit.

I have never seen the *Flata Limbata* in motion unless when disturbed. They appear to pass their lives in a state of inactivity, merely moving round the stems of the shrubs, and never willingly leaving them until disturbed, when they spring off with a sudden hop, as the larva did before them, and like them, although dispersed far and wide, they gradually make their way back to the twigs of their favorite bushes.

The eggs are deposited within the twigs of the shrubs, which are punctured in patches of about one inch in length all round the stem, which frequently bears four or five of these nests; the places of deposit are detected by a slight swelling of the wood.

It is stated in Westwood's edition of Donovan's insects of China, that the wax deposited by the "*Flata nigricornis*," has been supposed to be the excrement of the insect, but that such is not in reality the case. I am of opinion, however, that the supposition is correct, and that the wax-like substance is nothing more than an accumulation of the faeces dropped in a liquid state from the larva, and I am strengthened in this belief from observing, that a perfect shower of minute liquid drops descends at intervals from the clusters of larva, and that these drops after accumulating and partially drying, are converted into the waxy state from which it is supposed wax candles are made, and which furnishes the famous white wax of the Chinese Empire. It has been suggested, that the liquid drops are an exudation from the punctured branches of the tree, but this I think is impossible; because in the first place, the drops of liquid are so minute and so sticky, that they would not have weight enough to cause them to detach themselves from the punctured stems; and secondly, because the larva are so closely clustered together round the stems, that any juices dropping from the tree, would never reach the ground, but must inevitably be intercepted by, and accumulated upon the bodies of the larva, which would thereby be destroyed. From these observations I am of opinion, that the liquid is the excrement of the larva, and it appears to differ very little from

the white powder and anal canopy of white cottony down with which the insect is loaded.

Kirby and Spence seem to think it very doubtful whether the Chinese wax is in reality the produce of the "*Flata limbata*;" and remark, that as Sir G. Staunton merely *supposes* that such is the case, and as he does not appear to have tried the experiment of dissolving the wax in oil, there is more reason to believe, that the white wax of China is the produce of a totally different species. In this opinion I most fully concur, from the results of experiments made on the wax-like substance procured from the "*Flata limbata*."

Westwood refers the wax to the "*Flata nigricornis*" of China, and states that the *F. limbata* inhabits Ceylon. Cramer, who figures both insects, gives Ceylon as the *habitat* of *F. limbata*, but assigns Africa as that of *F. nigricornis*; the specimen of the latter however, figured in Donovan's Insects of China, is said to have been taken from India. It is probable, therefore, that *F. limbata* may occur in Ceylon, India and China, and that *F. nigricornis* may likewise be found in the two latter countries, for Chinese forms are exceedingly common in this part of India, and this season I have captured both the Chinese Atlas Moth (*Saturnia Atlas*,) and two fine specimens of "*Buprestis bicolor*," said to be an inhabitant of Java.* I have likewise a species of *Flata* agreeing in all respects with *F. nigricornis*, except in wanting the row of black dots along the posterior margin of the elytra.

The newly-deposited wax of *Flata limbata* I found to dissolve readily in water, and when boiled and allowed to cool, a deposit of clear white crystals was formed in the vessel; these had no taste, and felt gritty in the mouth. On trying to dissolve this deposit in warm or even in boiling oil, no combination of the two took place, nor was I more successful in my endeavours to dissolve the crude wax in oil; while the attempt to melt it on the fire without water or oil proved altogether abortive, the wax merely burning and consuming away till it became converted into a hard and baked substance. Melted in water, the mixture assumed a brownish hue with strong aromatic scent. Thus all my endeavours to convert the substance into wax for economical purposes, according to the directions given in Westwood's edition

* Mr. W. H. Benson also possesses a specimen of *B. bicolor*, taken here some years since.

of Donovan's Insects of China, failed most completely, thereby proving the doubts of Messrs. Kirby and Spence to be well founded, and clearly shewing, that the article termed the white wax of China, is not the produce of the "*Flata limbata*."

Regarding the Chinese wax, Du Halde informs us in his '*Histoire de la Chine*,' that "Il y en a qui disent que c'est la fiente de ces insectes qui s'attachant a l'arbre forme cette cire, *mais ils se trompent*." (Westwood's Donovan's Insects of China, p. 41.) Notwithstanding this assertion, I am of opinion that if Du Halde refers to *F. limbata*, he is himself in error, and that the wax-like substance produced by that species, which Kirby declares to be the Chinese insect adverted to, is nothing more, as I have above stated than the fæces of the larvæ. Is it, however, fully ascertained that the species of insect referred to by the above named author, is really the *F. limbata*, or even the *F. nigricornis*, as stated by Donovan? This at least is certain, namely, that if the wax of the Chinese insect is soluble in warm oil, as Du Halde and Sir G. Staunton have declared it to be, it cannot possibly be the produce of the *F. limbata*, for I have shewn already by experiments, that the produce of that species is altogether *insoluble* in oil.* Besides this, Du Halde relates that, "after melting and straining the wax, it is thrown into cold water, where it congeals into small cakes." This too will not hold good with respect to the wax of *F. limbata*, for after melting it on the fire and immersing it in cold water, a precipitation of beautiful small clear crystals is produced, instead of cakes of wax. Neither will the substance melt on the fire, nor combine with oil, like true wax, but requires the aid of water to dissolve it.

It is not improbable that Sir George Staunton may have supposed this species to be the true wax insect, from the mere circumstance of its producing a *wax-like* substance on the branches and leaves of the shrubs on which it feeds, for he does not say positively that he had ascertained it to be the fact, but merely that the powder was *supposed* to form the white wax of the East.

The Abbé Grosier's account of the wax insect can moreover in no way be made to apply to the larva either of *F. nigricornis* or *F. limbata*; for he states, that the tumours on the branches "increase until they

* Unless some peculiar kind of oil may possess the power of dissolving it?

are as big as a walnut, and that those nests are the abdomens of females, filled with the eggs which are to give birth to the cocci, which when hatched, disperse themselves over the leaves and *perforate the bark under which they retire,*" and that the wax is afterwards "*perceived rising from the bark round the body of the insect,*" (vide Kirby and Spence, vol. 1. p. 327.) Now as already stated above, the eggs of *F. limbata* are deposited in the branches of the tree, the bark of which is perforated or punctured all round quite closely in longitudinal rows to the length of about one inch; their presence being indicated by a very slight intermescence of the wounded parts. When the larva are hatched they *come forth from beneath the bark*, and cluster in hundreds around the stems and twigs, living thenceforward unconcealed, and depositing a liquid shower upon the leaves beneath their resting places, which as it hardens in the air, assumes a wax-like appearance, and eventually becomes pure white like hoar frost, when it cracks and falls to the ground in pieces of various size and thickness, and is soon incorporated with the dust.

From all these statements, therefore, we arrive at the positive conclusion, that as this deposit will neither melt on the fire *per se*, nor combine with oil, it cannot be the substance from which the famous white wax of China is formed; and we are led to perceive from the difference in the habits of the larva of *Flata limbata*, and that of the insect mentioned by the Abbé Grosier, that the wax is rather the produce of a species of coccus than of the larva of *Flata limbata*, or even of the allied *F. nigricornis*.

Specimens of the wax are sent for analysis:—

No. 1. The crude fresh wax as gathered from the leaves.

No. 2. Is the wax after drying from exposure to the air.

No. 3. Is the deposit of crystals on the cooling of No. 1. Dissolved on the fire with water.

No. 4. Is a specimen of "*Flata limbata*."

Should the wax, after analysis, be found of any use, either medically or otherwise, it can be collected in considerable quantity from January till June.

THOMAS HUTTON, Captain,

Mussooree, 15th August, 1843.

Bengal Army.

Qualitative Examination of the Native Copper found on Round Island in the Cheduba group South East of Ramree, and forwarded to the Society by Captain CAMPBELL. See Proceedings Asiatic Society for April 1843. By S. MORNAY, Esq.

H. TORRENS, Esq., *Secretary of the Asiatic Society of India.*

MY DEAR SIR,—I have great pleasure in handing you the result of the examination I have made, at your suggestion, of the Copper*from Flat Island.

My own business has occupied me so much lately, that I have had very little spare time to give to the investigation, or I should have finished it much sooner.

Your most obdt. servt.

S. MORNAY.

A qualitative Analysis of Native Copper found on Flat Island, in the Bay of Bengal.

A piece digested with heat in dilute Sulphuric Acid for several days, left a grey powder undissolved, (residuum No. 1.) The solution was pale blue, precipitated with Bi-carbonate of Ammonia, and re-dissolved, all the soluble part of the precipitate with Caustic Ammonia.

In the undissolved part found globules of *Mercury*, separated them and dissolved the rest in cold Muriatic Acid. The solution was greenish yellow: neither boiling nor diluting with water made any alteration. This solution was affected by reagents, as follows:—

Caustic Potash—White, permanent.

Caustic Ammonia—White, ditto.

Carb. of Soda—Snow white.

Hyd. Sulp. of Amm.—Green black.

Ferro-chyaz. of Potash—Dark blue (whole mass coagulated.) In some experiments this reagent merely changed the color of the solution to a dark olive green, owing to the acidity of the solution.

Tincture of Galls—Brown,
it therefore contained *Titanium*.

The above-mentioned solution in Caustic Ammonia evaporated to crystallization, gave beautiful blue crystals; those dissolved in water, behaved as follows:—

Caustic Potash—Pale blue, permanent.

Ditto Ammonia—Pale blue, flocculent: in excess of Ammonia, soluble with the beautiful blue color characteristic of Copper

Carb. of Soda—Pale blue green, permanent.

Bi-carb. of Ammonia—Pale blue: in excess soluble with the same blue color, as above.

Hyd. Sulp. of Ammonia—Black.

Ferro-chyaz. of Potash—Brick red.

Tincture of Galls—No re-action.

Mur. of Barytes—Dense white.

they were therefore pure Sulphate of *Copper*.

Residuum No. 1, melted by the blow-pipe, in the oxidizing flame with Borax and Phosph. of Soda, gave a limpid gloss: but in the reducing flame, at the moment of cooling it assumed a beautiful garnet color, which was permanent, till the bead was fused again in the oxidizing flame, when it became limpid. When much of the oxide was used, the lead assumed a clear black instead of the garnet color.

In some experiments, the color was dirty brown, but a little tin added, immediately purified the color.

These two experiments prove the presence of Titanium and a little *Iron*.

Residuum No. 1, digested in Muriatic Acid, cold. (At the bottom of the vessel, appeared small limpid crystalline scales, brilliant as the diamond.)

The solution behaved as follows:—

Caustic Potash—White, permanent.

Ditto Ammonia—Ditto ditto.

Carb. of Soda—Ditto ditto, (very voluminous.)

Hyd. Sulp. of Ammonia—Black.

Ferro-chyaz. Potash—Emerald green. (In three days turned opaque dark blue and deposited.)

Tincture of Galls—Brown.



Titanium again :

The bright scales dissolved in slightly acidulated water :—

Caustic Potash—White, soluble in excess.

Ditto Ammonia—Ditto, permanent.

Carb. of Soda—ditto ditto, (dense white.)

Hyd. Sulp. of Ammonia—Black.

Ferro-chyaz. Potash—White.

Tincture of Galls—Pale brown.

Sulp. Acid—Dense white.

Nitrate of Silver—Ditto. ditto, flocculent.

they were therefore Muriate of Lead.

In one experiment, another piece of the copper dissolved in Nitric Acid, left a heavy white residuum, which, digested in concentrated Sulp. Acid, left another residuum, which last digested in an excess of Muriatic Acid, boiled and diluted with water, gave a solution which shewed the presence of Cobalt ; as under :—

Caustic Potash—Brown.

Ditto Ammonia—Blue rose.

Carb. of Soda—Pale rose.

Bi-carb. Ammonia—No re-action till the Acid was neutralized, when pale rose.

Hyd. Sulp. of Ammonia—Pale dirty yellow.

Ferro-chyaz. of Potast. Emerald green, (next day dark blue deposit.)

Tincture of Galls—Brown.

∴ Cobalt with a little Titanium.

Summary.

This Mineral is an alloy of Copper, Titanium, Mercury, Lead, Cobalt and Iron, in different proportions.*

Remark.

The different pieces vary in their composition.

S. MORNAY.

No. 13, Chowringhee Road, 28th November, 1843.

* There is, in the Philosophical Magazine for June 1843, an account of a Fahlerz containing Mercury from Hungary, but we have as yet found no traces of Sulphur or Antimony with our Mineral. The specimen which I examined, which was one of the first sent up by Capt. Williams was nearly pure native copper, with a coating of red oxide and the blue and green carbonates.—H. P.

Memoranda of Earthquakes and other remarkable occurrences in Upper Assam, from January 1839 to September 1843. By Capt. HANNAY, B. N. I.

| Year. | Month. | Day of Month. | Occurrences. | Remarks. |
|-------|---------|---------------|-----------------------------------|---|
| 1839 | January | 14, | Earthquake 9 P. M. | Felt at Suddeeah, direction apparently from S. W. to N. E. preceded some days by rain and heavy snow in the mountains; air very cold. |
| ..... | Feb. | ..... | ..... | This month commenced hot, with dreadful hail storms, thunder and lightning. |
| ..... | June | 3, | Earthquake 8 P. M. | At Suddeeah, apparently from South to North, strong N. E. wind. Burrumpooter high, wet and disagreeable weather.—N. B. From March up to this date, the season unusually rainy. Small-pox very prevalent, lost several men and a native officer from this disease. |
| ..... | Sept. | ..... | Cholera. | Cholera broke out, and continued with more or less severity at Suddeeah until the end of November; about 30 men in the corps died—this disease followed a Detachment which proceeded on service into the Mishmee Hills on the 18th October, and spread amongst the Hill tribes.—N. B. Although I now forget the month, I think there were four shocks of Earthquakes felt at Suddeeah in 1839. |
| 1840 | March | 4. | Total Sun Eclipse and Earthquake. | When the sun was obscured, the air was unusually cold and disagreeable to the feelings, even to nausea. About an hour after the Eclipse passed off, i. e. about 1 P. M. a smart shock of an Earthquake, and about 10 minutes afterwards another; both shocks appeared to have come from south—these I felt outside, the sky cloudless, but the atmosphere hazy. |
| 1841 | Feb. | 9, | Earthquake. | 1840. Passed without any thing else remarkable; it was a healthy and seasonable year. Felt an Earthquake at Gowhatty on either the 9th or 11th, forgot which. This Earthquake was different to those above-mentioned; it was accompanied by a low rumbling noise; was sharp and stunning, as if a blow had been struck under the jaw; the others alluded to, appeared, on the contrary to have more of a trembling or rocking motion. |
| ..... | June | ..... | Gales. Meteor. | Strong gales on the Burrumpooter, both this month and July, from the N. E. N. B.—In February 1841 at night, a splendid Meteor was seen at Seebisagur, and in other stations in Upper Assam. It passed from East to West of the heavens, and burst with a loud report, the first like the firing of several large guns, and ending exactly like musquetry file firing.—Individuals on the Frontier who had not seen the Meteor, imagined some of the out-posts had been attacked. |



| Year. | Month. | Day of Month. | Occurrences. | Remarks. |
|-------|---------|---------------|-----------------------------|--|
| 1842 | January | 4, | Earthquake 7½ P. M. | A smart shock felt at Seeksagur; the weather gloomy, cold and threatening rain; cannot speak as to duration; shock similar in motion to those already noticed. |
| 1842 | June* | Gales. | ..... | From 3d to 6th, heavy gale of wind from South-west. |
| ..... | October | 29, | Earthquake about 8 P. M. | A smart shock of an Earthquake; duration apparently from S. W. to N. E. trembling motion. |
| 1843 | Feb. | ..... | ..... | Air unusually wet; a disagreeable month. |
| | March | 7, | Comet. | Seen at Sakenah on the evening of the 7th of this month. Head with a common compass W. 21° South, and of Tail West 47° South—rain continued most of this month. |
| | April | 4, | Meteor. | From East to West seen at Seeksagur, burst with two loud reports. |
| | April | 6, | Earthquake 8 P. M. | After a very hot day and close sultry evening, a severe shock of an Earthquake at Dibrooghur, lasted several minutes. The motion however was only trembling, affected those houses which had posts built up by walls; duration appeared to be from West or South-west. |
| | April | 7, | Earthquake. | Slight shock felt at Dibrooghur at midnight. N. B. Both these Earthquakes felt at Seeksagur, Jeypoor and all over Upper Assam. |
| | May | 24, | ..... | From this date to 27th May, gales of wind at Seeksagur from S. W. Some of the squalls very severe, sky in the day time clear, but stiff looking, with some white fleecy clouds; gale blowing hard on 26th along the line of the Naga mountains 15 miles distant, and on the Burrumpooter, which rose very high. |
| 1843 | June | 15, | Earthquake 11 P. M. | At 11 A. M. smart shock of an Earthquake; motion, vertical. |
| ..... | June | 17, | Earthquake 8 P. M. | A very smart shock; at first slight and followed by a severer one; motion undulating, and from the position of a clock which was stopped, must have come from S. W. or West; lasted altogether about a minute. The weather rainy, with occasional light squalls from S. W. These shocks felt at Dibroo, Jeypoor and Sakenah, that of this date at a few minutes past 8, reported by the Officer to have thrown down a portion of the bank of the Burrumpooter. |
| | August | 23, | Meteor. | A meteor of no great magnitude passed to the North, very vivid lightnings in the S. W. several flashes appeared as if rising from the ground like the bursting of a shell. |
| | Sept. | 3, | Earthquake 2½ P. M. | After as hot and sultry a day, (the 2d) as I ever felt, the clouds gathered to S. W. indicating rain, but passed off without any; night very close and sultry; awoke by a smart shock of an Earthquake; cannot speak as to duration. |

During these months, Cholera very severe at Gowlattee, Nowgong and Durrung; several cases at Seeksagur in June, but none fatal.

| Year. | Month. | Day of Month | Occurrences. | Remarks. |
|-------|--------|--------------|------------------------|---|
| 1843 | Sept. | 3, | Earthquake 7½ P. M. | After a very hot day, clouds gathered at S. E. very close and sultry; squall came on a little before sunset; vivid lightning all round the heavens; previous to squall, making an extraordinary noise in the heavens over head like the falling of heavy rain on distant jungle, or like the rushing of wind through a funnel, with this noise you heard an occasional growl like distant thunder. When the rain fell, this noise, which had continued for sometime ceased—thunder very high in the heavens, but the lightning one blaze all round. Whilst at dinner, smart shock from the South. |

*Memorandum of various Phenomena in 1843. By the Rev. N. BROWN,
Missionary Assam.*

January 14.—Great gale in England.

February 8.—Earthquake at Antigua.

February 18.—Earthquake at Leipsic.

February 27.—The comet passed its Perihelion.

March 3.—Comet seen at Sea 10° S Lat. 25° W Long.

March 6.—Comet seen at Calcutta.

March 10.—Earthquake in England at 1 A. M.

April 1.—Earthquake at Bellary at 5 A. M.

April 4.—Meteor at Sibsagur,

April 6.—Earthquake at Sibsagur about 8 o'clock in the evening.

April 7.—Earthquake at Sibsagur at 1 A. M.

June 3.—Earthquake at Titalyah.

June 15.—Earthquake at Sibsagur at 11 A. M.

June 16.—Earthquake at Sibsagur at 8 P. M.

June 17.—Earthquake at Ceylon.

August 23.—Evening, a meteor fell near Sibsagur.

September 3.—Earthquake at Sibsagur at ½ past 2 A. M., another at ½ past 7 P. M.

Proceedings of the Asiatic Society.
(Wednesday Evening, the 4th October, 1843.)

The regular Monthly Meeting was held on Wednesday evening the 4th October.

The Honourable the President in the chair.

The following new Members were balloted for and proposed :—

Dr. A. Sprenger, B. M. S. was duly elected ; and —

W. Ganthony, Esq. was proposed by the Secretary, and seconded by Mr. Piddington.

The following list of Books, presented and purchased, was read.

Books received for the Meeting of the Asiatic Society on the 4th October, 1843.

The Calcutta Christian Observer, October 1843, new series, vol. iv, No. 46.

Presented by the Editor.

The Calcutta Literary Gleaner, Calcutta, August and September 1843, vol. ii,

Nos. 6 and 7. Presented by the Editor.

Supplement to the Oriental Christian Spectator, 2nd series, Bombay, August 1843, vol. iv, No. 8. Presented by the Editor.

The Monthly Journal of the Agricultural and Horticultural Society of India, Calcutta, 1842-43, vol. ii, Nos. 1 to 7.

Hart's Report on the Trade and Resources of Kurrachee, Calcutta, 1843. Presented by Government.

Survey of the Route from Kurrachee to Sehwan, Calcutta, 1843. Ditto.

Report on the Kulleeree Canal, 1840. Ditto.

Collection of Papers regarding the course of the Indus, and especially of its Eastern Mouth and the Branches falling into the Runn of Cutch, Calcutta, 1843. Ditto.

The Annals and Magazine of Natural History, London, June 1843, vol. xi, No. 72.

Yarrell's History of British Birds, London, June 1843, vol. i, part 37.

Wilson's Translation of the Megha Duta, or Cloud Messenger, 2nd Edition, London, 1843. From the Author, H. H. Wilson, Esq. &c. &c.

Stevenson's Translation of the Sanhita of the Sama Veda, London, 1842.

Selections from the Mahabharata, edited by F. Johnson, London, 1842.

Sanhita of the Sama Veda, from MSS. prepared for the Press by the Rev. J. Stevenson, London, 1843, (Sanskrit.)



Read the following letter from the Secretary of the Royal Asiatic Society of London:—

To the Secretary of the Asiatic Society of Bengal, Calcutta.

DEAR SIR,—I have had the pleasure to receive, through Messrs. W. H. Allen and Co. your letter of the 11th May, enclosing a Bill of Exchange for £21, the amount of two years' Subscription of your Society to the Oriental Translation Fund. As Messrs. Allen and Co. have paid the Subscriptions for 1842 and 1843, the amount of your Bill shall be duly credited to your Society for the years 1844 and 1845.

With thanks for your obliging attention to my request for a remittance,

I have the honor to remain, Dear Sir,

London, 14, Grafton Street, Bond Street,

11th July, 1843.

Your's truly,

JAMES REYNOLDS,

Secretary.

Read the following letter from the Society's Booksellers and Agents, Messrs. Allen and Co.:—

To H. TORRENS, Esq. Secretary to the Asiatic Society.

SIR,—We have received your letter of the 11th May, informing us of your having resumed the duties of Secretary to the Asiatic Society, upon which we congratulate you. By the enclosed letter you will observe, that we have paid £21 to the Rev. James Reynolds, on account of the Subscription of the Society to the Oriental Translation Fund for the years 1842 and 1843. We shall be obliged by your attention to our letters of 29th April, and 17th and 30th June last, addressed to Mr. Piddington, as Secretary to the Society.

We are, Sir,

Your most obedient Servants,

WM. H. ALLEN & Co.

London, July 31, 1843.

Read the following letter from Mr. John Murray, son and successor of Mr. John Murray, of Albemarle Street, London:—

SIR,—Among the numerous accounts of Books which, in succeeding to the business of my late father, I have caused to be made out, is that of the Royal Asiatic Society,* and I now forward you a copy of it from 1834, when it was last settled. The balance due to the Society shall be paid as you direct, as soon as you furnish me with the authority for so doing, and enable me to obtain a receipt.

I have to call your attention to the very slow and partial sale of the Transactions for some years past, and to suggest that, if you were to place the work in the hands of some publisher more intimately connected with India, the interests of the Society might be more surely advanced. I have to request you to take this into consideration, and to authorize me to deliver over the stock now in my warehouse to such Agent as you may appoint. As I anticipate removing my warehouse shortly, it would be very convenient to me to resign this charge, which I feel to have been an honor.—From some error in our enumeration, we paid the Society for certain copies of Vol. VII, which we now find are still in our hands.

I remain, Sir,

Your obedient Servant,

J. MURRAY.

Albemarle Street, August 4.

* So in MSS. the common mistake of confounding the *Asiatic Society of Bengal*, with the Royal Asiatic Society of London.

Dr.

The Asiatic Researches in Account with JOHN MURRAY.

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|---|---|
| <p>1843, June 30.</p> <p>To Advertising to this date, ... £. s. d. 8 8 0</p> <p>9 Copies of Vol. VIII, accounted for last Settlement as sold, but still on hand at 32, less the Commission, 12 10 3</p> <p>28 Vol. XVIII. pt. I to Messrs. Parbury and Co, 19-6 ... 19 10 0</p> <p>15 ditto to Asiatic Society, Cal- cutta, 19-6 14 12 6</p> <p>Balance carried forward, ... 16 11 3</p> <hr/> <p style="text-align: right;">72 1 0</p> | <p>1834.</p> <p>April 1 5 Vol. I. on hand at this date, remains the same.</p> <p> 2 " II. ditto ...</p> <p> 105 " VI. ditto ...</p> <p> 201 " VII. ditto ...</p> <p>+ 106 " VIII. ditto ...</p> <p> 202 " IX. 2 sold 32 3 4</p> <p> 153 " X. 1 ditto 32 -1 12</p> <p> 217 " XI. 1 ditto 32 -1 12</p> <p> 59 " XII. 1 ditto 32 -1 12</p> <p> 50 " XIII. 2 ditto 32 3 4</p> <p> 29 " XIV. 2 ditto 32 -3 4</p> <p> 13 " XVI. 7 ditto 32 -11 4</p> <p> 15 " XVII. 9 ditto 32 -14 8</p> <p>+ 9 " VIII. Additional on hand.</p> <p>Physical Class. 40 " XVIII. pt. I. Received 19-6 } 39</p> <p>ditto. 10 " XVIII. pt. II. ditto 2 sold 10-6 } 1 1</p> <hr/> <p style="text-align: right;">80 1 0</p> <p style="text-align: right;">Commission, 8 0 0</p> <hr/> <p style="text-align: right;">72 1 0</p> |
| <p>1843, June 30.—To Balance car- rried forward,... 4 9 6</p> <hr/> <p style="text-align: right;">4 9 6</p> | <p>1843.</p> <p>June 30. Balance carried forward, 16 11 3</p> <p>Svo. By 293 on hand, last settlement Dec. 1829.</p> <p> 284 on hand, June 30, 1843.</p> <p> 9 sold, 11, 4-19</p> <p> Commission, 9 6</p> <hr/> <p style="text-align: right;">4 9 6</p> <hr/> <p style="text-align: right;">4 9 6</p> |
| <p>Copies on hand June 30, 1843.</p> <p>5 vol. I. 2 " II. 105 " VI. 201 " VII. 115 " VIII. 209 " IX. 152 " X. 216 " XI. 58 " XII. 28 " XIII. 27 " XIV. 6 " XV. 6 " XVI. 6 " XVII. 8 " XVIII</p> <p>Part of 284 of vol. XII. 8 vo.</p> | <p>1843.</p> <p>June 30. Balance carried forward, 4 9 6</p> <p>Ditto on the 18 vols. as per Acct. above, 16 11 3</p> <p>Due to the Asiatic Society, 21 0 9</p> |

The following letters relative to this matter are here inserted for the sake of connection :—

To J. MURRAY, Esq. *Albemarle Street, London.*

SIR,—I have the pleasure on behalf of the Asiatic Society of Bengal, to thank you for your communication of the 4th August last, forwarding your Account Current with the Society closed to the 30th June last, exhibiting a balance of £ 21: 0: 9 due to the Society, which sum you are hereby requested to pay to Messrs. W. H. Allen and Co. of Leaden hall Street, on their receipt.

Messrs. Allen and Co. will also receive from you the stock of Books you have on hand on behalf of the Society.

I am, &c.

Calcutta, 13th December, 1843.

H. TORRNES.

Messrs. W. ALLEN and Co., London.

DEAR SIRs,—I had the pleasure to address you on the 5th September last, to which begging reference, I now take the opportunity to enclose a letter to the address of Mr. J. Murray of Albemarle Street, requesting him to transfer to you the stock of Books he has on hand belonging to the Asiatic Society, which up to the 30th June, 1843, was as per Memorandum furnished by Mr. Murray, and is annexed to this communication for your information and guidance. Mr. Murray has been also requested to pay to you, on your receipt, the sum of £ 21 : 0 : 9, being the balance due to the Society from him. This sum you will place to the credit of the Society in Account Current with yourselves.



1843.]

Asiatic Society.

913

The stock of Books which will be received by you, you will sell as opportunities offer, placing proceeds to credit of the Asiatic Society, and furnish A. C. in course for information.

I have &c.

H. TORRENS.

13th December, 1843.

Read the following letter from Messrs. Allen and Co.

To the Secretary to the Asiatic Society, Calcutta.

The 13th June, 1843.

SIR,—We beg to advise you of our having forwarded a case to the above address, by the ship Essex, containing a marble bust of the late James Prinsep, Esq. We enclose a Bill of Lading.

The Bust was sent to us by Professor Wilson, with instructions to forward it to the Society by an early opportunity.

We beg to annex for your information, an account of the shipping and other expenses incurred by us, which sum we have placed to the debit of the Society.

We have the honor to be, Sir,

Your most obedient Servants,

WM. H. ALLEN & Co.

London, June 17, 1843.

Asiatic Society, Calcutta, London, to Messrs. WM. H. ALLEN and Co. per "Essex."

June 12,
1843. Asiatic
Society, Calcutta.
H. Piddington,
Esq. Secre-
tary.

| | |
|--|-----------|
| Case containing Marble Bust of J. Prinsep, value £105 | |
| forwarded by direction of Professor H. H. Wilson. ... | £105 0 0 |
| <i>Charges.</i> | |
| Entry, Wharfage, Shipping expenses and Bills of Lading, ... | 0 14 0 |
| Freight £1: 7: 0; Insurance on £110. at 40 per cent £2: 4: 0 | |
| and policy 10s. ... | 4 1 0 |
| | £109 15 0 |

Read letter from Messrs. Collett and Co. acknowledging receipt of the 49 (not 50 as supposed) copies of the Scinde Vocabulary, sent to them for sale.

Read the following letter from the Secretary to Government of India in the Foreign Department:—

No. 193.

Office Memorandum.

The Secretary to the Government of India in the Foreign Department has the honor of forwarding to the Secretary of the Asiatic Society, for deposit in the Society's Library, one copy of each of the printed papers noted in the margin.

Collection of Papers regarding the course of the Indus, &c.
Survey of the Route from Kurrachee to Sehwan.
Report on the Trade and Resources of Kurrachee.
Report on the Kulleeree Canal.

Fort William, Foreign Department,

The 30th September, 1843.

J. THOMASON,

Secretary to the Govt. of India.

The Secretary stated, that it had been brought to his notice by Dr. Roer, the Librarian, that the present Library rules were by no means sufficient for the careful and exact custody of the Books, and that some amendments and additions were imperatively required. Ordered, that the Committee be requested to revise the Library Regulations.



Read the following papers, detailing the progress which had been made since the Meeting of September, in carrying into effect the Society's resolution to address Government on the subject of the new Volcanic Island and Copper Ore deposit near Cheduba.

Memorandum by the Geological and Mineralogical Curator, as requested by the Society.

At the September Meeting of the Society was read the following letter of Captain D. Williams, Assistant Commissioner, Arracan :—

No. 1824.

MY DEAR SIR,—The Sogree, or head revenue officer on the Island of "Regaing," or "Flat Island," has just made a report, of which the enclosed is a translation, that on the 26th, 27th, 28th and 29th of last month, a Volcano broke out in the sea, a little distance South of "False Island," and a new Island was formed.

On reference to a chart of Arracan, you will see that "False Island" is East of "Flat Island," and the latter is South of "Round Island," whence I obtained the Copper Ore I lately sent to the Asiatic Society; the groupe is situated on the S. E. shore of the Island of Chedooba. I consider the subject of sufficient interest to report on to the Society, especially as regards its vicinity to the Island where the Copper Ore was found.

Yours, &c.

Ramree, August 9, 1843.

(Signed) D. WILLIAMS.

P. S. I have sent for specimens of the new formation.

2. A notice of the Copper Ore alluded to will be found in our Proceedings for the month of April, but I may briefly state here, by way of connecting the facts for consideration, that in March Captain Williams sent us up some very pure specimens of rolled native (virgin) Copper, and a ring manufactured from them by a native artist, which he stated had been found on Flat Island.

I wrote for more of it, as also for information as to the site, and specimens of the matrix, &c. before reporting on the subject to Government, and Captain Williams in reply sent me a quantity of gravel and shells from the sea shore, without a trace of the ore amongst it,* which the native discoverers had brought to him as a sample of the bed or place where the ore was found. I thought this very suspicious, and that it was probable that the natives having found out the value of the Copper ore, were now concealing the spot from Captain Williams, and wrote again to him, urging him if possible, to send a person in some degree qualified to give us a plain common-sense account of the place where this rich ore was obtained, upon which I could found a recommendation to Government, in my report, to have the place properly examined, as there could be no doubt of the value of the ore; but that the quantity and expense of obtaining it were the next and most important considerations. I also mentioned it to Captain Brown and Mr. Howe, the

* Some more Copper was also sent *separately*, and these specimens were of a different kind of Copper ore from those first sent.—H. P.

Naval Officers at Kyook Phyoo, and to the Commissioner, Captain Bogle. Captain Williams' last reply was, that he feared that for the present they had no one who would be likely to furnish a good account, but mentions Captain Siddons, the local Engineer Officer, to whom I intended to write, but illness for the last five weeks has prevented the preparing of my report to Government, and further correspondence on the subject.

Capit. Williams' letter was read at the meeting, but omitted in the Proceedings.—

MY DEAR SIR,—An apology is due from me to you for having neglected to reply to your letter of May last, (I believe,) about the Copper Mine on Round Island, of which I am reminded by your letter, just received, of the 28th ultimo.

- I should then have informed you, or I now beg to do, that it is necessary for a scientific person being sent to examine the spot. There is no such individual in this province that I am aware of, unless Lieut. Siddons of the Engineers, just arrived, may be; this must be done too in the fine season between November and April.

I lately sent up two gold Coins found on Chedooba to the Asiatic Society; since then I have had brought in two lumps of iron six inches long by $1\frac{1}{2}$ inch broad in the centre tapering to the ends, found on the same spot with the coins; the natives here tell me, they are weapons used by the *Eastern pirates*, which they hurl like a javelin at boats in attack, and that some such pirate boat must have been wrecked on Chedooba where the iron and coins have been found. I do not give sufficient credence to so improbable a story as to induce me to send up one of the *Javelins*, but will keep them for the Asiatic Society's orders.

Yours very truly,

Ramree, July 20, 1843.

D. WILLIAMS.

3. It was proposed and sanctioned at the Meeting, that the Society should respectfully represent to Government the importance of dispatching some fully qualified person to the spot to examine into, and report upon it for general information.

4. The principal grounds upon which we may do so are, as they occur to me, the following:—

First.—The great, and indeed intense interest which geological phenomena of this kind invariably excite in Europe, as being connected with, and most strongly illustrating many researches and theories relative to the past and future changes of our globe.

Secondly.—Their interest in a maritime point of view, as connected with the appearance and disappearance of shoals, &c. in seas extensively navigated.

Thirdly.—The occurrence of the phenomenon so immediately in our own vicinity, and at a spot with which by means of the H. C. S. *Amherst*, we have a regular communication; so that, to use a homely phrase, "we have no excuse" for neglecting to investigate it.

Fourthly.—The great interest attaching to it as occurring so near to the spot of the recent eruption of the mud volcano of Ramree, and so soon after the great earthquake at Pulo Nias, on the coast of Sumatra, and its forming the Northern extremity of the great volcanic band laid down by Von Buch as extending only to Barren Island.

Fifthly.—Its undoubted connection with all the singular phenomena of the upheavements going on upon the Island of Cheduba, as by Captain Halstead's report, and the rich field which the adjoining coasts and islands probably afford for valuable geological data, as to the former changes which have taken place both there and further to the Northward and inland to the Eastward.

Sixthly.—The foregoing considerations are geological ones. The presence of the rich copper ore makes it perhaps a matter of *financial* importance to Government to trace out if possible whence this is derived. It may be a mere ejection from the volcanos, as is supposed to occur in Iceland, or it may be that some of the islands or shoals are masses of copper ore, or that rich deposits of copper exist on the mainland or on the banks of the Aeng river; and I should mention in reference to this, that, as shewn to the Society at a recent meeting in the case of silver ores, rich ores of copper (the grey, black, and tile copper ores) might easily be thought common stones by those unaccustomed to recognise them.

There are, in short, all the *possibilities* from zero upwards, in such matters; and it is rare indeed that the opportunity occurs of tracing out on the same spot at one and the same time two questions, the one of abstract and the other of practical science.

Lastly.—I need not remark, that in researches of this kind, mere zeal without knowledge is a very insufficient qualification, and that it would be most unfortunate were the Society not to represent to Government in the strongest terms, that the most fully qualified person that can be found should be selected, and this plainly on financial as well as on scientific grounds.

If Members of the Committee of Papers will kindly add such farther suggestions as may occur to them, we shall be able thereupon to draft a letter to Government, setting forth the Society's views on this question, and respectfully soliciting its adoption of them.

H. PIDDINGTON,

13th September, 1843.

Curator Mineralogical and Geological Departments.

Memorandum by the Secretary.

I have to submit to the Hon'ble the President and the Committee of Papers, a note prepared by the Curator of the Museum of Economic Geology, upon the proposed recommendation to Government, that a properly qualified person be sent to report upon the peculiar geological phenomena, which have been recently observed in the neighbourhood of Chedooba Island, as also upon a discovery of copper ore in the immediate vicinity of the volcanic influence.

The opinion of the Society has been recorded as to the high expediency of such a measure, and it now only remains to be decided, whether Government should be addressed as being requested to despatch a proper person, or whether the Society should not rather propose to select and despatch such a person, superintending, controlling, and directing his operations, the general charge being defrayed at the public cost.

I should be prepared in the event of the latter proposition being entertained, to lay before the Hon'ble the President, the names of qualified persons, from whom an em-



ployé might be selected, and have even had a proposition made me by a gentleman of scientific attainments to be allowed to accompany the person deputed as for his individual satisfaction, giving the advantage of the result of his observations. This would give us a double set of notes.

I need not say that we have no officer of the Society available for this scientific mission. The duties of the Museum imperatively require the constant presence and steady exertion of our officers, for after years of labor we are only just now beginning to establish order, and the good work must not be relaxed in.

I have the honor to request orders on the above points. H. TORRENS,

Vice President and Secy. As. Socy.

H. TORRENS, Esq. *Secretary, Asiatic Society of India.*

SIR,—Having heard that the Society contemplate sending a person to investigate certain Geognostical phenomena in the Indian seas, I beg leave to offer my humble services to the Society for that purpose.

In support of my pretensions I hand you with this, copies of three documents, the originals of which I have by me, ready to produce when called for.

Mr. Marshman's letter I shew you, merely to prove that I have executed work of a scientific and laborious character in this country, without any assistance, to the satisfaction of a man well capable of judging it.

The report of Mr. Robt. Stephenson, the Engineer of the London and Birmingham Railway, upon the plans and estimates for a Railway in Brazil, shews that he was satisfied with my work in this peculiar line,—and the document upon which I lay most stress, is the certificate of the Council of Mines of Saxony; on the face of which you will see, that I have acquired some knowledge of all the Arts and Sciences which bear upon Mining, including Geology, Mineralogy, Chemistry, Metallurgy, Assaying, Surveying, and Mining Engineering: all of which may probably, more or less, be brought into action, on this occasion.

I beg to assure you, that if the Society should entrust me with this interesting commission, no exertion shall be spared by me to further the objects of my employers.

Your most obedient Servant,

Calcutta, 25th September, 1843.

S. MORNAY.

Mr. Mornay's certificate above alluded to is as follows:—

We, the Council of Mines of the Kingdom of Saxony,

Hereby testify, that Mr. Stephen Mornay from London, was matriculated on the Mining College of this place, by Royal License, dated 9th October 1829, and that he attended the following courses of lectures with great industry and very good success; viz. Mining; Geology; Mineralogy; Petrefactology; Natural Philosophy; General, Technical, Metallurgical, and Analytical Chemistry; Metallurgy; Transcendant Mathematics; Construction of Mining Machinery; Architecture and Drawing. And that he proved himself zealous in the attainment of practical knowledge in Geology and Mining. And that his conduct has always been moral and gentlemanly.



To certify these facts, we have, at his request, drawn up this certificate, sealed with the seal of the Council of Mines. Signed by us.
LS.

| | | |
|---|----------|---------------------|
| <i>Freyberg, 6th October, 1832. Royal Saxon</i> | (Signed) | FREYHEER V. HERDER. |
| <i>Council of Mines.</i> | (Ditto) | H. V. MANDELSLOH. |
| <i>Certificate for S. Mornay, No. 1966.</i> | (Ditto) | R. E. G. SEGELITZ. |

H. T. TORRENS, Esq. *Secretary, Asiatic Society of India.*

SIR,—In reference to the offer of services contained in my letter to you of the 25th instant, and in regard to the payment of those services, I beg to state that I readily agree to the terms and conditions proposed by you at the Society's Rooms yesterday; viz.

1st. That I receive Co's. Rs. 400 (four hundred) per mensem, for whole months, and Co's. Rs. 150 (one hundred and fifty) per week for broken periods.

2nd. That I receive Co's. Rs. 3 (three) per diem, for my travelling expenses, whenever I am not supplied by the Honourable Company, with the means of conveyance, and

3rd. That all contingent expenses be defrayed by the Honorable Company.

I beg to add, that my time is in no way engaged, and that consequently I do not limit the term of my services to any period, but shall be glad to be employed on any other service I may be deemed fit for by the Society.

Your most obedient servant,

Calcutta, 28th September, 1843.

S. MORNAY.

The Secretary and Committee of Papers were requested to address Government, proposing that a scientific person be deputed at the public cost to investigate the Geological and Mineralogical Phenomena of this quarter.

Read the following letter from Capt. D. Williams, 1st Assistant to the Commissioner Arracan:—

MY DEAR SIR,—I have now the pleasure to send you the two lumps of iron that were found with the gold coins on Chedooba, and which, the natives say, are the weapons used by the pirates from the Eastward in their attack on boats. Lieutenant Phayre, the Senior Assistant of Sandoway, proceeds to Calcutta on leave on the "*Amherst*," and will probably take charge of these lumps of iron, and if I see him on his way, I will request him to converse with the natives on the subject. I shall feel extremely obliged for any information that may be gained respecting the gold coins; they are not coins of this country, either under the Mug or Birman dynasties, as Lieutenant Phayre can prove.

Yours sincerely,

Ramree, August 23, 1843.

D. WILLIAMS.

The lumps of iron alluded to were exhibited. They are much corroded, but their form seems to have been, when perfect, a rough double square pyramid, of about two or three inches on each side joined at the base, which

is now about two inches only. They presented externally the usual carbonised appearance and softness of iron which has been much exposed to water, but were found to be internally sound and metallic.

Read the following letter from Conductor Dawe, relative to the remains of the Dadoopoor Museum, which have been kindly offered to the Society by Capt. Baker, B. E. :—

To H. PIDDINGTON, Esq. Sub-Secretary, Asiatic Society, Calcutta.

SIR,—I beg to acknowledge the receipt of your note respecting the collection which has been offered to the Society by Captain Baker, and in reply, I beg to inform you, that I find in the Museum three or four fair specimens of Mastodon's heads; a few large masses of the heads of above with the upper jaws, and the teeth in good preservation; several of lower jaws of above, the enamel of the teeth in good condition; a few fragments of heads and bones of Hippopotamus and Rhinoceros, and numerous bones of smaller animals in a fractured state, but which can be easily joined with our cement. I can also select a variety of the teeth of deer, horse, bullock and the like. But what I now particularly write for, is, to get your instructions as to the quantity you would wish me to send, as I find the cost of each six dozen chest full that has been sent down to Calcutta through the merchants at Meerut, has been on an average 21 rupees each, including land carriage from this place to Gurmuckteesur Ghat, (eight stages,) and boat hire thence to Calcutta.

As soon as I receive your reply, I shall have much pleasure in selecting what you may require.

I remain, Sir,

Your obedient servant,

Dadoopoor, Sept. 6, 1843.

WM. DAWE, *Condr. Canals West of Jumna.*

It was stated that Mr. Dawe had been requested to forward the whole of these valuable relics.

Read a letter from Capt. Thos. Hutton, B. N. I. accompanying specimens of the Flata Limbata, with that of its wax, and a paper on this Insect and the White Wax of China.

The paper was transferred to the Editors of the Journal for publication. Read the following letter from Capt. Hannay, B. N. I. : from Seebisagur, Assam.

MY DEAR SIR,—Perhaps the enclosed Memo. from this part of the world may be interesting. I wish I could speak more correctly as to Earthquakes, for we have I am pretty sure a number of shocks yearly, commencing about January after our first rain which falls about New Year. After very sultry and close weather the air becomes very cold, and we could thus almost say, that atmospheric influence had something to say to our Earthquakes, else we are in the vicinity of some Earthquaking power. Most of our shocks do not appear to be felt lower down the valley, but I have understood that at Tezpoor, shocks are very frequent. No volcanoes in the neighbourhood, but the line of the Naga Hills (nearer ranges) abound in iron and coal and numerous Petroleum springs, and in the Singpho country springs of white thin mud. You may depend upon my notes of all the Earthquakes put down in the Memo. The shocks this year have been nine in number, and severe compared to those of other years, particularly on 17th June last. It is difficult, however, to ascertain the duration of the shocks. In 1834, an Earthquake threw down partly the old palace of Rungpoor, and a part of the earth opened near Jorehath, from which issued red sand and water. The Cholera visited the valley in 1834, 1839, and 1843.

Your sincerely,

Seebisagur, 5th September, 1843.

W. HANNAY.

This peculiarly interesting document was transferred to the Journal for publication, and the Sub-Secretary stated, that he had had a copy prepared for forwarding to Lieut. Baird Smith, who has so zealously taken up this branch of research.

Read the following letter from G. Buist, Esq. in charge of the Hon'ble Company's Observatory at Bombay :—

H. TORRENS, Esq. *Secretary to the Asiatic Society.*

DEAR SIR,—I duly received, through the Bombay Government, a copy of your application to be supplied with copy of the Registers of the Bombay Magnetic and Meteorological Observatory at present temporarily under my charge.

I should have complied immediately with your request, and forwarded a monthly number of our observations so far as they extend, that is, from 1st September 1843, without delay, but that as we were on the eve of completing the year, I have thought it better to defer for a few weeks, when the volume will be sent to you.

I have taken the liberty of explaining this to you for the information of the Society, lest you should suppose that the delay had arisen from any neglect or inattention.

I have forwarded by the Ship *Samuel Boddington*, to the address of Mr. Piddington, a copy of a chart for the use of the Asiatic Society of the readings of nine Barometers observed simultaneously for 24 hours, projected on curves—the memoir explanatory of this is now nearly ready, and will be sent by post.

I shall at all times have the greatest gratification of forwarding for the use of your Society, any documents connected with the Observatory they may desire to possess.

I have the honor to be, &c.

Bombay, 6th September, 1843.

GEO. BUIST.

Read a letter from Capt. Thos. Hutton, B. N. I. offering for sale to the Society, a large collection of above 1600 specimens of Natural History from Affghanisthan and the Hills. The offer was declined, the Society already possessing a large proportion of the specimens.

Read extract from a letter from Capt Boileau, Magnetic Observatory, desiring to know whether the Society would be willing to take up the publication of his Hygrometric Tables.

It was resolved, that the Society do so.

Read the following extract of a letter from Lieutenant Colonel Reid, R. E. Governor of Bermuda, and author of the well known work on the Law of Storms, addressed to the Sub-Secretary, affording a gratifying proof of the interest taken in that branch of research at home, and of the advantage which the early publication of the labours of scientific men through the Society's Journal affords them.

MY DEAR SIR,—I have received all your six Memoirs, and I believe all your letters, and I should have answered your last one sooner, but for the importance I attached to the Memoir on the Storms of the China Seas. I have read it with great attention, and the more I considered it, the more I saw you had bestowed great pains upon it. As I went on reading, I drew a diagram on the margin for each storm, such as a seaman would have to draw, had he no data but his own observations in the midst of a

storm. If you could get wood-cuts made at Calcutta, such diagrams would, I think, improve your papers.

There can be no doubt, as you shew, that some of the Storms as they pass over the China Sea, have sometimes a course to the Southward of West. At first I thought the Storm of each of the ships called *Thetis* must be but one storm: but after attentive study, I am more inclined to agree with you and with your paper, which throughout bears the impression of attentive consideration. I hope you will be able to go on, and be supported in your endeavours to develop this great subject as regards the Indian Seas. I do not doubt that you will be assisted by the Governor of Hong-Kong and the British Government Agents in China, and shall consider whether any recommendation from me can help to procure such aid for you, not from the intrinsic worth of any recommendation of mine, but of the value of the subject, and the importance of it in saving life and property.

Here the Admiral on this station, Sir Charles Adam, is giving us great assistance by requiring all the squadron under his command to improve the mode of keeping the log books, and helping in what he can to track the gales. One Storm we have followed from the West Indies nearly across the American continent, at least to the mountain ridge beyond Victoria in Mexico.

I do not recollect that I sent you a copy of the enclosed printed note.—“On sailing on curved Courses when meeting with revolving winds,” which has been printed three times over. I hope soon to receive some other tract from you. Believe me,

Yours, &c.

Government House, Bermuda, 23d June, 1843.

(Signed) W. REID.

*Read the following Report from the Curator Museum Economic Geology,
for the months of August and September.*

During the month of August, illness having prevented my preparing a report, the present one will comprise both months.

Museum Economic Geology.

Our first contribution here is a truly valuable one from Mr. Homfray, to whom the Journal is indebted for a valuable paper on the coal mines of the Damoodah District, in 26 specimens from the Amanath and others of the Palamow Coal Fields, comprising specimens of the strata (in one instance to the granite) and of various trap dykes of the greatest geological and mining interest. Mr. Homfray's letter is as follows:—

H. PIDDINGTON, Esq.

MY DEAR SIR,—I have now the pleasure to forward for the acceptance of the Asiatic Society for their Museum of Economic Geology, a set of specimens of the strata in the Amanath Coal Field of Palamow District, as also some others from the Palamow Coal Field, together as per list annexed.

I have also sent some of the principal specimens of the sandstone rock which I have hitherto met in sinking my deep pit at Salmah, now, August 1843, down as low as 275 feet, having passed

through seven veins of inferior and thin Coal and one of Iron stone, and am still going downward, having persevered for many years in sinking this pit, and at an enormous outlay of money to myself alone.

I send also two pieces of the Basaltic Dykes taken from the place where the two greatest Dykes of the Coal Field of Dameodah actually cross each other; thus one is from the Bharah Dyke to distinguish it from that of Salmah, and this Bharah is evidently the most recent, as it runs through that of Salmah, and the other piece is from the Salmah Dyke at the same locality. The Ironstone from beneath the Behareynauth Hill is the same sort as what is now smelted near to Gautcole.

From the Barracar I send a piece of the great fault (Greenstone) which throws up and cuts off abruptly the vein of Coal, and also a curious sample of the Coal found and cut from the vein close to the fault.

I am, Dear Sir,

Yours faithfully,

J. HOMFRAY.

Golahdangah, Howrah, 18th August, 1843.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Sandstone, the upper one of the Amanath Coal Field. 2. Shale. 3. Sandstone the second. 4. Ditto (hard) from the middle of Coal vein. 5. Ditto with pebbles over main Coal. 6. Shale below main Coal. 7. Sandstone below ditto. 8. Ironstone. 9. Main Coal. 10. Conglomerate Sandstone below the Ironstone. 11. Black Shale below ditto. 12. Syenitic Quartz. below ditto. 13. Granite below ditto. 14. Found in the pass between Shapore and Chopercee. | <ol style="list-style-type: none"> 15. Black Shale found to the Westward of the Coyle and towards the Kunkur Run. 16. Limestone (Lias?) from Rotasghur. 17. Black Shale from near Bidgeghir by Kuleas Copas village. 18. Ironstone from Potua Agar in the Palamow Coal Field. 19. Thin Coal from several veins in the river near Rotas (Palamow.) 20. Five samples of Sandstone from the Salmah pit, now sinking. 21. Clay slate from ditto. 22. Basalt from Bharah Dyke, } at the intersec- 23. Ditto from Salmah ditto, } tion. 24. Ironstone from Behareynauth. 25. Coal from the fault in the Barracar Colliery at the fault. 26. Greenstone from the above fault. |
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Our next contribution is from Captain R. Ouseley, Assistant to the Agent of the Governor General, S. W. Frontier, who forwards with the following letter, specimens of Agalmatolite.

To the Secretary of the Asiatic Society of Calcutta.

DEAR SIR,—I have the pleasure to forward by this day's Dawk Banghy, a small package to your address, containing three specimens which appear to me to answer the description given in "*Jameson's Manual of Mineralogy*" of Agalmatolite, or Figure stone.

The two smallest pieces I polished myself by rubbing them on a broad file. I have not yet visited the spot where it is to be found, but am told that it can be obtained in large quantities, and from all accounts, slates of considerable size might be gained by skilful workmen, adapted for chimney pieces, tops of teapots, &c. &c.

As my duty will probably take me in the direction where the stone is found, I shall endeavor in the cold season, to proceed to the spot and examine it myself. I shall feel much obliged if you would inform me whether this may be considered a discovery of any value, and if you let me know on what points, and regarding what minerals, &c. you would wish to have information, I shall at all times have much pleasure in forwarding any I may obtain.

I am, Dear Sir,

Yours very faithfully,

R. OUSELEY.

In reply to which I wrote as follows :—

MY DEAR SIR,—Your specimens duly arrived, and I am glad to say are as you supposed Agamatolite; the light greenish-white kind is probably the most valuable, but we should have some good slabs and blocks sent down to ascertain their value in China, where some of the kinds, and of the varieties of Jade (Axe-stone often found near these rocks,) are highly prized. You may have seen in the papers that they are shipping the New Zealand kind, which is like transparent green marble, to China. Carriage is the great obstacle I fear from your quarter, but however, you may be able to find out a cheap road. Kindly give us early information as to localities, &c. and as the rock has an evident tendency to seam and split in rhomboidal fragments, any approaching to crystals would be a great prize if you can find them.

Your best specimen of lead and antimony ore contains a mere trace of silver, but in my report which has gone in to Government, I have urged the importance of sending a practical man to the spot. The report is now printing, and I will send you a slip as soon as I get one.

Yours very faithfully,

22nd August, 1843.

(Signed) H. FIDDINGTON.

From the Superintending Engineer, S. E. Provinces, Major Fitzgerald, B. E. we have received a box containing the various specimens of Tin alluded to in Capt. Tremenheere's report of his visit to the Pakchan river, which with the former one, will thus be available in the Museum for the inspection of those who may interest themselves in these matters.

Geological and Mineralogical Department.

Observing in a paper published by Brigadier Twemlow in the Journal, No. 135, p. 229, mention made of "indurated clay with fossils" near Ellichpoor, I wrote to him, requesting the favour of specimens. He has sent us one which is of much interest, a hornstone porphyry with imbedded casts of shells from thence, and he promises others as soon as he can obtain them.

MY DEAR SIR,—I have the pleasure to acknowledge the receipt of your polite letter of the 12th instant; it will give me much pleasure if I can be of any use to the Society, and in attention to your request, I forward immediately a specimen of the fossil shells alluded to in note E. of my communication of date 30th August, 1841, to the address of the Secretary, of the Agricultural and Horticultural Society. I shall be glad if you would at your leisure inform me what the matrix is, and the name of the larger shell if it can be made out. I found the specimen* in the bed of a nullah at the south base of the range of hills about six miles N. N. E. of this cantonment; I will search for the site whence it was washed.

I am, Dear Sir,

Yours truly,

Ellichpoor, July 29, 1843.

GEORGE TWEMLOW.

As the consideration of my note on the advantage and utility of deputing a qualified person to examine the new Volcanic Island in the neighbourhood of Ramree, and the site from whence the copper ore was obtained, has formed a special matter of discussion, I do not further allude to it here, as it will be found in the Proceedings.

H. FIDDINGTON.

* With others having the appearance of wood outside, as in the small specimen sent herewith. This is a fragment of fossil bone.—H. P.



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| Burnouf et Lassen, Essai sur le Pali, ou Langue Sacrée de la presqu'île au de là du Gange. Paris, 1826, pages 222, 8vo. ... | 3 | 0 |
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JOURNAL

OF THE

ASIATIC SOCIETY.

*Mr. Blyth's monthly Report for December Meeting, 1842, with
Addenda subsequently appended.**

SIR,—The following donations have been received since our last Meeting :—

1. From the Barrackpore establishment.

A fine old male of the Wandaroo Monkey (*Macacus Silenus*). The skin has been mounted, and the skeleton also set up.

A recent example of the *Rhizomys badius*, Hodgson, received from Arracan. This animal entirely accords with Mr. Hodgson's description in *Calc. Jour. Nat. Hist.* No. V, 60: and I have also had both its skin and skeleton set up.

Also a recent example of what I am assured is the Sikim breed of long-haired domestic Goat, being (if I remember rightly) the same as that erroneously figured by Mons. F. Cuvier as the Kashmir or Shawl Goat, and nearly similar to the mixed race produced between the latter and the Angora Goat. In our present specimen, the hair is excessively copious, as fine as that of the human head, and straight; being comparatively short on the fore-quarters, where it does not exceed five inches in length; on the back it averages nine inches; and on the

* The lateness of the appearance of this and subsequent monthly Reports due up to the present time, is owing to the circumstance of my having been too much occupied at the time the arrears of the Journal were brought up, to pass them severally under review prior to their being laid before the public, for the purpose of incorporating what additional information I had received bearing on the subjects treated of, and which it was desirable should be brought forward upon the same occasion.*—E. B.



sides and rump it exceeds twelve inches, the quantity on these parts being truly enormous, and hanging in dense flakes more or less matted, which contain large felted masses of the cast inner *poshm*, that it would not be possible to separate as now entangled (though, by attention to combing these animals at the season of shedding the *poshm*, I presume this might be removed, and the value of the fine long hair thus enhanced, while the *poshm* would also be available for œconomic purposes). The true Shawl Goat, as is now well known, is not a long-haired race, but has a rigid tubular coat resembling that of the wild *Ægagrus*, or of the true Stags, &c., only of twice the ordinary length, beneath which is the very abundant supply of *poshm*, or fine silky wool, of which the Kashmir stuffs are manufactured; while the Angora breed is quite devoid of the *poshm*, having only silky hairs of one quality, which hang in elegant ringlets to a remarkable length.

Also a recent Himalayan Chicore (*Perdix chukar*).

2. From Mr. DeCruz, of the Botanic Garden, an unusually fine specimen of *Paradoxurus typus*, which has been mounted.

3. From Dr. McClelland, a recent example of *Ierax melanoleucos*, Nobis, *ante*, p. 179 (*bis*), from Assam.

4. From Mr. F. Harris, a specimen of an Albatross pertaining to a species new to the museum, being probably the *Diomedea melanophris*, Tem. Col. 456, thus briefly described in Griffith's Work, VIII, 572, which is the only account I can find of it in the library of the Society. "Beak, wings, tail, and streak through the eye, black; the rest dirty-white." The specimen before me is under three feet in length, closed wing twenty inches, tail nine inches, bill to forehead (in a straight line) four inches and a half, and middle toe and claw nine inches. Head, neck, and under-parts, with the rump, white, but little sullied, and merely a faint trace of a dark streak through the eye: mantle, wings, and tail, black, tinged with ashy; and some unmoulted brown coverts on the wings: bill pale yellowish, the extremities of both mandibles dusky, except the extreme tips, which are whitish; and feet apparently have been cinereous.*

* Another specimen of this Albatross has lately been presented to the Society by Mr. R. Macdonald Stephenson: it merely differs in having the beak suffused throughout with dusky, and the hind-neck with smoky-grey; being probably a female.



Daption Capensis.

5. From Mr. J. Stalkart, a large living specimen of *Varanus bino-*
tatus.

6. From M. Claude Queiros, a small specimen of a Flying Fish
(*Dactylopterus orientalis*), caught off the Cape.

7. From W. H. Benson, Esq., Moradabad, three species of Shells
transmitted by letter in a quill; viz.

Triarta montana, Benson; four specimens, from the Bhoantal Lake,
Kemaon.

• *Planorbis calathus*, Benson; six specimens, Moradabad.

Cyclostoma strangulatum, Hutton; four specimens, Landour.

8. From R. Ince Esq., Superintendent of Salt Chokees, Zillah
Backergunge, three bottles containing—

Specimens of a *Gryllus*, very destructive to young vegetables, and
which abounds in the Society's compound.

One of an *Acanthodis*, which I have also obtained in the Calcutta
Botanic Garden: and

Two specimens of the small Moonah Worm, which Mr. Ince found
considerable difficulty in procuring. This Worm is of a very different
species from that described in *J. A. S.* XI, 601; having no mandibles
that should enable it to perforate wood. It measures from three to
four inches in length, and is furnished with a suctorial mouth, the
circular lip of which is studded externally with small cones of a dark
colour, and forms on its upper portion a pair of tubercles having each
four similar cones, between and above which tubercles are four other
cones of the same kind: this lip is surmounted by a mask having three
divisions, the central of which is furnished with a very distinct pair
of eyes situate near the first ring of the body, and laterally to each eye
are placed four small branchial laminae. The rings of the body are
very numerous, and are each furnished with a lateral wide lamina,
bearing three packets of bristles appearing like fins; and on the up-
per side of each lamina is a dark spot. Colour, as appearing in spirits,
light brown.

The Collector sent by the Society to Darjeeling has returned, with
examples of the following species, of which those new to the museum
are marked with an asterisk.



Mammalia.

Ursus labiatus : a skeleton.

* *Talpa cryptura*, Nobis : a skin, and a specimen in spirits.

* *Sorex aterrimus*, Nobis : an adult male, and a young one, both in spirits. (This and the preceding species will be described in a monograph of Indian *Talpidae*).

Sciurus bicolor, Sparrman.

Sciuropterus Turnbullii (?), Gray, *P. Z. S.* 1837, p. 67; *Mag. Nat. Hist. n. s.*, I, 584. From recollection of the British Museum specimen on which this name was founded, I strongly incline to the opinion that I have assigned this correctly, but have elsewhere given a description of some Darjeeling specimens, which are inferior in dimensions to those ascribed to *Sc. Turnbullii* by Mr. Gray.†

AVES.

Falco tinnunculus.

Accipiter nisosimilis, Tickell, *J. A. S.* II, 571.

Athene Brodiei; *Noctua Brodiei*, Burton, *P. Z. S.* 1835, p. 152; *N. tubiger*, Hodgson, *As. Res.* XIX, 175.

Upupa epops.

Bucco grandis ; three specimens.

—— *Franklinii*, Nobis, *J. A. S.* XI, 167.

Picus (*Gecinus*) *Nipalensis*, Hardwicke and Gray; doubtfully cited *P. mentalis*, apud Jerdon.

P. (*Dendrocopus*) *Himalayanus*, Jardine and Selby : two males.

Cuculus canorus : young of both sexes.

—— *micropterus*, Gould : female.

† From the same locality, the Society has lately been presented, by Mrs. Oakes, with a fine specimen of *Sciuropterus caniceps*, Gray, *Ann. and Mag. Nat. Hist.* 1842, p. 262; one of *Sciurus lokriah*, Hodgson, *J. A. S.* V, 232; and one of *Sc. McClellandii*, Horsfield, *P. Z. S.* 1839, p. 151, to which species must be referred *Sc. Pembertonii*, Nobis, *J. A. S.* XI, 887. This little Himalayan Squirrel is represented on the Neilgherries by *Sc. Delesserti*, Is. Geoff., and in the Malay countries by *Sc. insignis*, Horsfield, and I believe others. By E. B. Ryan Esq., the Society has been presented with a Darjeeling specimen (at least the skin was purchased there) of *Felis macrocelis*, which species has since been sent from Nepâl by Mr. Hodgson. Vide *J. A. S.* XI, 275. These two specimens vary much in ground-tint, inclining respectively to grey and to fulvous; but their markings are very similar.

* *Cuculus poliocephalus*, Latham, v. *Himalayanus*, Vigors and Gould : female.

Corvus macrorhynchos, Vieillot, v. *culminatus*, Sykes : sent as the Raven of Darjeeling.

Crypsirina Sinensis.

* ——— *altirostris*, Nobis, n. s., adult and young. Described in the sequel.

Keropia striata ; *Garrulus striatus*, Vigors.

Garrulax chrysopterus ; *Ianthocincla chrysoptera*, Gould.

• ——— *albogularis* ; *I. albogularis*, Gould : *Cinclosoma albigula*, Hodgson.

Ixops Nipalensis, Hodgson : *Cinclosoma Nipalense*, and subsequently *Alcopus* (olim *Sibia*) *Nipalensis*, of the same naturalist : six specimens.

Heterornis (olim *Cutia*) *Nipalensis*, Hodgson : six specimens.

* *Pteruthius rufiventer*, Nobis, *J. A. S.* XI, 183, two males.

———— *erythropterus* ; *Lanius erythropterus*, Vigors and Gould.

Leiothrix cyanoptera ; vide XI, 184.

———— *strigula*.

———— *castaniceps*.

Parus monticolus, adult and young.

Certhia Himalayana.

Sitta Nipalensis, Hodgson.

* *Temnoris* (olim *Suthora*) *Nipalensis*, Hodgson.

* *Prosorinia* (olim *Cochoa*) *purpurea*, Hodgson.

* *Xiphoramphus superciliaris*, Nobis, *J. A. S.* XI, 176.

* *Cinclidium frontale*, Nobis, *J. A. S.* XI, 181.

Calliope (?) *cruralis*, Nobis, n. s. Described in the sequel.

Enicura maculata.

* *Zoothera monticola*, Vigors and Gould ; three adults, and a young one.

Turdus (*Merula*) *pæciloptera*.

T. (*Geocichla*) *citrina*.

T. (*Petrocincla*) *affinis*, Nobis, ante, p. 177 (*bis*).

T. (*Petrocincla*) *erythrogastra*, Vigors and Gould. *N. B.* The sexes of this species differ remarkably in their first or nestling plumage, the young males having the wings and tail blue, as in the adult males, while in the females of all ages these are brown ; besides which, the

mottled clothing plumage of the young males has the same fulvous ground-colour as the under-parts of the adult females, this being whitish in the young females, contrasting greatly with the corresponding garb of the other sex.

* *Chaitaris* (Hodgson) *grandis*, Nobis, *J. A. S.* XI, 189; two males and a female.

Ch. sundara, Hodgson.

Saxicola caprata; female.

* *Rhipidura hypoxantha*, Nobis, *n. s.* Described in the Sequel. (Genus *Chelidorhynx*, Hodgson.)

Anthus agilis (?).

Alcurus (Hodgson) *striatus*; *Tricophorus striatus*, Nobis, XI, 184.

Dicrurus macrocircus, Vieillot.

Coccothraustes melanocephalus, Hodgson.

* *Corythus* (?) *Sepahi*, Hodgson, *As. Res.* XIX, 151; a male and a female. The minute subdivisions among the *Fringillidæ* are almost endless, and many grade and pass insensibly into each other: but this gorgeous species is certainly out of place in the form typified by *C. enucleator*, whilst the other species described by Mr. Hodgson on the same occasion by the term *C. subhemalayanus* [which the Society has also since received from Darjeeling] is a true *Corythus* in its plumage, but a *Pyrrhula* in its beak. The present bird is more allied to some of the *Erythospizæ* of Bonaparte, but is distinguished from them by its larger size and more tumid bill. It is occasionally procured by the Calcutta bird-dealers.

Erythropsiza (?) *rosea*.

Corypha (?) *baghaira*.

Treron sphenurus.

Columba (*Macropygia*) *tusalia*. Described in the sequel.

REPTILIA.

Three species of Snakes, one of them allied to the European *Natrix torquata*: and

Hyla obtusa, Nobis. A Tree Frog distinguished from the common *H. maculata* of Bengal by its nearly uniform dark colour and more obtuse muzzle; the back is also considerably broader, and the loins are less contracted. The skin of the entire under-parts is perfectly

smooth, instead of being minutely tuberculated as in *H. maculata*. The limbs also are proportionately much larger and stronger. Colour of the specimen preserved in spirits dark livid brown, with a broad lateral black band commencing at the nostril, continued beyond the eye, and becoming less distinct after passing the fore-leg; sides of the abdomen, and the thigh, a little mottled or speckled, and the fore-limbs and legs obscurely banded with livid black: beneath pale and spotless. Length from muzzle to vent two inches and one-eighth,* and breadth behind the eyes seven-eighths of an inch, of the loins half an inch; anterior limb to end of longest toe an inch and a half, and hind limb ditto four inches and a half: eyes large and prominent.

PISCES.

Pimelodus nangra, Buch. Hamilton.

Pimelodus — ? Young.

Cyprinus cotus, Buch. Ham.

Gobio isurus, McClelland.

Silurus — ? Young.

Solea isostoma, McClelland, M.S.

MOLLUSCA.

Three species of Shells, undetermined.

CRUSTACEA.

One large species of *Oniscus*, which also occurs on the Neilgherries.

ARACHNIDA.

Two or three Spiders, one of large size, which I have somewhere seen figured, and which is common here during the cool season, and also inhabits the forests of Malabar.

INSECTA.

A considerable collection, almost entirely consisting of *Lepidoptera*, *Coleoptera*, and a moderate number of *Hemiptera*. Among the first, is the celebrated Purple Emperor Butterfly of Europe (*Apatura iris*), and various other European species, as *Doritis Apollo*, *Rhodocera* v. *Gonepteryx rhamni*, the cosmopolite *Cynthia cardui* (which I have also procured near Calcutta, and have specimens from Afghanistan

and from Swan River (!), *Papilio Machaon* (very small, as are all the Himalayan examples which I have seen), and some of the more rare Himalayan species, several of which I have made out from the excellent work of M. Boisduval in the *Suites à Buffon*.

The new species of birds from Darjeeling are as follow :—

Crypsirina (Vieillot) *altirostris*, Nobis: genus *Phrenotrix*, Horsfield; *Dendrocitta*, Gould. Nearly allied to the Assamese *D. frontalis* (McClelland* and Horsfield), with which it would appear to form a particular section of the group, characterized by having the bill shorter, but much more compressed and deeper, than in the others;—being in fact absolutely that of *Glaucopis*, so far as I can remember the latter. Length fifteen inches, of which the tail measures nine inches and a quarter, the penultimate feather being two inches shorter, and the outermost six inches and a half shorter; of wing five inches and one-eighth; of bill to forehead (through the feathers) an inch, and five-eighths of an inch deep; tarse an inch: claws remarkably long, that of the hind-toe five-eighths of an inch, measured in a straight line. The head (including the vertex, but not the occiput), ear-coverts, throat, and fore-neck (to the breast), are deep black; wings and tail also black, the coverts of the former, excepting those of the primaries, pure ash-grey; the occiput and remainder of the neck, together with the breast and belly, whitish-grey; the back, scapularies, upper and lower tail-coverts, vent and flanks, bright ferruginous (as in *Cr. vagabunda*); tibial feathers mingled grey and rufous: bill and feet black. Young similar in markings, but all the colours, excepting the black and ferruginous, much duller; the plumage of flimsy texture.

This is the sixth species of its genus now ascertained to inhabit India or its immediate confines, besides the *Phrenotrix temia*, Horsfield, which Dr Helfer asserts is met with in the Tenasserim provinces. The others are as follow :—

1. *Cr. vagabunda*; *Coracias vagabunda*, Latham; figured in Gould's *Century*. Everywhere abundant, I believe, throughout India, and in the Tenasserim provinces.

2. *Cr. Sinensis*; *Corvus Sinensis*, Gmelin: figured in Gould's *Century*. A mountain species, common on the Himalaya, and Mr. Jerdon thinks that he has observed it in open jungle in the Segoor

Pass of the Neilgherries, and he has seen specimens killed in the eastern range of ghâts of Southern India.

3. *Cr. leucogastra*; *D. leucogastra*, Gould, *P. Z. S.* 1833, p. 57, and figured in *Trans. Zool. Soc.* I, pl. XII. Mr. Jerdon has only seen this elegant species in the jungles of Malabar and the Wynaad, and it would appear to be peculiar to the Indian peninsula.

4. *Cr. rufigastra*; *D. rufigastra*, Gould, *P. Z. S.* 1837, p. 80. "Nearly allied to, but differs from *Cr. leucogastra* in its shorter tail, and in the less extent of the black colouring on the tips of the two central tail-feathers, in the chestnut-brown colouring of the under surface, and in the thickened and more robust bill. India."

5. *Cr. frontalis*; *D. frontalis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 163. Assam.

6. *Cr. altirostris*, Nobis, *ante.* Darjeeling.

Other species of this genus exist, or appear to exist, in — 7. *Cr. rufa*; *Corvus rufus*, Latham, *Supp.*; *la Pie Rousse de la Chine*, Sonnerat; and figured by Levaillant as *la Pie Rousse, Ois. de l'Afrique*, pl. 59: which was observed in China by Sonnerat, and is said to be also found in India.—8. *Cr. rufiventris*; *Pica rufiventris*, Vieillot: Shaw's *Zoology*, XIV, 64. Apparently very closely allied to, if not identical with, *Cr. vagabunda*; and said to inhabit Eastern Asia.—9. *Cr. leucoptera*, *Glaucopis leucopterus*, Tem., *pl. col.* 265, (see also Griffith's *Work*, VII, 184, or Shaw's *Zoology*, XIV, 73:) from the Malayan Archipelago.*—10. *Cr. temnura*; *Gl. temnura*, Tem., *ibid.* 337: briefly described in Griffith's work as — "Plumage dusky-black, shaded with dark grey; tail curiously scalloped, India?"—And 11. *Cr. varians*; *Corvus varians*, Latham, *Supp.*; *Temia*, Levaillant; *Phrenotrix temia*, Horsfield, *Lin. Trans.* XIII, pt. I, 162, and figured and further described in his 'Zoological Researches in Java.' Inhabits the Malay countries, and (apud Helfer) the British Tenasserim provinces.

Calliope (? Gould) *cruralis*, Nobis. Under this generic designation, I avail myself of Mr. Jerdon's suggestion to merge the genus *Larvivora*, Hodgson, *J. A. S.* VI, 102, at least as instanced by the

* This I have just received, and find that it is properly referred to a separate genus—*Temnuris*, Lesson. Mr. Hodgson's generic name *Temnoris* approaches this too nearly.

Phœnicura superciliaris, Jerdon (*Supplement to Catalogue*), which quite agrees with Mr. Hodgson's description of *L. cyana**: and the present species is only distinguishable from that bird, on its upper parts, by a very slight and inconspicuous character; whilst the lower, being concolorous with the former, but paling a little on the belly, affords a very striking contrast with those of *C. cyana*, wherein they are wholly bright ferruginous with the exception of the lower tail-coverts: the tarsi, also, of our present species are considerably longer, as in my *Cinclidium frontale*, and of a dark colour: its wings are shorter and rounder than in the other species of *Calliope*; and tail rather shorter and weak. Length five inches and a quarter, of wing two inches and five-eighths, and tail an inch and three-quarters; bill to forehead (through the feathers) nearly five-eighths of an inch, and typically formed; tarse an inch and a quarter. Colour a full deep cyaneous, or dark greyish-blue, paling on the belly, and relieved by a white superciliary streak, confined to the bases of the feathers and yet shewing conspicuously: bill black; and legs (in the dry specimen) brownish-dusky. This bird is reported to be a pleasing songster.

The genus *Calliope* would accordingly consist of the following five species, all natives of India or the Himalaya, being at most winter visitants in the low country.

1. *C. Lathamii*, Gould, *Icones Avium*; *Motacilla Calliope*, Pallas; *Turdus C.*, Latham; *Accentor (!) C.*, Temminck. A regular winter visitant in Bengal, and found likewise in Central India: being met with (according to the season) over the greater part of Asia, even in Kamtschatka. It is closely allied to restricted *Turdus*.

2. *C. pectoralis*, Gould, *Icones Avium*. Has a more graduated tail than in the others, tipped with white, which also extends over the basal half of the tail-feathers, except the middle pair, and on the exterior web of the outermost pair: general colour dark ashy, the middle of the belly white, breast and sides of the throat black, the rest of the throat bright crimson, and a white superciliary streak. Inhabits the Himalaya.

3. *C. cyana*; *Larvivora cyana*, Hodgson, *J. A. S.* VI; 102; *Phæ-*

* The Society has since received a specimen from Mr. Hodgson, shewing the above identification to be correct.

nicura superciliaris, Jerdon, *Supplement*. Nepāl: also the Neilgherries.

4. *C. brunnea*; *L. brunnea*, Hodgson, *ibid* (*Non vidi*). Nepāl.*

5. *C. (?) cruralis*, Nobis, *ante*. Darjeeling.†

Rhipidura hypoxantha, Nobis. Length four inches and a half, by six inches in alar expanse; of wing two inches and one-eighth, and middle tail-feathers two inches and a quarter; bill to forehead (through the feathers) under three-eighths of an inch, being proportionally much shorter than in its congeners; and tarse half an inch. Colour of the upper-parts dusky-ash, tinged with green on the head; lores black; a bright yellow eye-streak, continued across the forehead; and the under-parts wholly bright yellow: tail conspicuously white-shafted, with also white interior edges to the feathers for their terminal half: bill dusky above, the under mandible pale; and legs pale brownish, darker on the toes. Darjeeling. Specimen preserved in spirits.

The following are the Asiatic species of this genus at present known to me:—

1. *Rh. fuscoventris*, Franklin, *P. Z. S.* 1831, p. 117; *Broad-tailed Flycatcher* of Latham; *Muscicapa (Muscylva) albogularis*, Lesson, *Zoologie du Voyage de M. Bélanger*, p. 264. Common in the vicinity of Calcutta at all seasons, but rather of local distribution in peninsular India.‡ The male has a short, but musical, tinkling song.

2. *Rh. albofrontata*, Franklin, *ibid*. Common in peninsular India, extending northward to the vicinity of Saharunpore, where the preceding species is also met with; but it does not appear to occur in Lower Bengal.

3. *Rh. pectoralis*, Jerdon, *M. S.*§ Length about seven inches, of which the tail measures nearly four inches; closed wing three inches. Upper-parts brownish-dusky; the head black, passing into the former:

* Mr. Hodgson says "sexes alike," or I should have suspected the female of *C. Lathamii* to be intended.

† A Nepalese example of this species has just been received from Mr. Hodgson, who refers it to his genus *Larvivora*.

‡ The *Rh. fuscoventris* mentioned in Mr. Jerdon's catalogue as having been seen, but not procured, by him on the Neilgherries, proved to be *Rh. pectoralis*; but the other is included in Col. Sykes's list of the birds of Deccan, *P. Z. S.* 1832, p. 85.

§ Briefly described in the first No. of Mr. Jerdon's 'Illustrations of Indian Ornithology', which has just appeared.

superciliary streak, throat, and belly, white; the under tail-coverts tinged with rufous: sides of the throat and breast, black, the middle of the latter marked with oval white spots, smaller in front: wings dusky, the coverts slightly tipped with albescent; and tail the same, all but its middle feathers, passing gradually into whitish towards their extremity. Bill black; and legs dusky. The tail is much graduated, having its outermost feathers two inches shorter than the middle ones. Inhabits the Neilgherries.

4. *Rh. Javanica*; *Muscicapa Javanica*, Sparrman; *Platyrrhynchus perspicillatus*, Vieillot. Malay countries generally.

5. *Rh. nigritorquis*, Vigors, *P. Z. S.* 1831, p. 97. Philippine Islands: perhaps identical with last.*

6. *Rh. hypoxantha*, Nobis, *ante.* Darjeeling.†

Columba (*Macropygia*, Swainson,) [*tusalia*, Hodgson.] Male fifteen inches and upwards, of which the tail measures seven inches and a half, its outermost feathers four inches and a half shorter, and the rest evenly graduating; wing seven inches and five-eighths, the third primary rather the longest, and the second a little exceeding the fourth; bill to feathers scarcely five-eighths of an inch, and tarse seven-eighths. Colour of the upper-parts dusky-black, each feather narrowly but conspicuously margined, and more or less barred, with deep rufous; the forehead and cheeks whitish-grey, tinged with lilach: throat whitish: crown gradually more ashy; and occiput, nape, and hind-neck, successively more broadly margined with brilliantly glossed extremities to the feathers, of a changeable hue from green to purplish-red, upon a dark ashy ground; sides of the breast the same, its medial portion more narrowly thus edged: belly slightly tinged with pale buff, deeper on the lower tail-coverts: greater wing-feathers wholly dusky; and tail the same, its four medial feathers somewhat obscurely crossed with numerous rufous bars, the outermost pair greyish-white for the basal two-thirds of their exterior web, and the rest of the tail—except the middle feathers—ashy at

* Add *Rh. collaris*, Lesson, *Rev. Zool. par la Soc. Cuv.* 1839, p. 104. "*Corpore nigro; collo anticè niveo; superciliis albis; caudæ pennis albo marginatis aut terminatis.* Hab. Timor." This description does not well distinguish it from *Rh. fuscoventris*.

† Mr. Hodgson has lately sent a specimen also of this bird, which he separates from *Rhipidura* by the name *Chelidorynx*, an arrangement which I shall now adopt.

base, with a broad subterminal dusky band, and greyish tips successively paler to the outermost: bill dusky-black (in the dry specimen), and feet have evidently been coral-red. Female rather smaller, and similar to the male on its upper-parts, except that the barring on the tail is more developed, and the forehead and crown are also crossed with narrow rufescent lines, together with the entire under-parts. Length about fourteen inches, of which the tail measures seven inches and a quarter, and wings also seven inches and a quarter. Concealing the head and neck, this species might almost be mistaken for a *Cuculus*; more especially the female. From Darjeeling, where extremely common.*

[While the preceding notices were passing through the press, another interesting collection of Darjeeling specimens has been submitted to my inspection, and I have been kindly permitted to make a selection from them. The following appear to be undescribed:—

* Since the above was written, the Society has received a description of this Dove from Mr. Hodgson (dated May 1, 1843), who applies to it the generic or subgeneric term *Coccyzurus*, remarking further on its *Cuculine* appearance; but he mentions having “discovered it some years ago, and written a character of it on the back of the drawing (No. 663), that went to England long ago to be locked up there!” His description now sent is as follows:—

“*Vinagina*. [To this location of it I demur altogether.—E. B.] Genus *Coccyzura* (olim *Tusalia*), Hodgson. Bill long and slender, as in *Columba*: wings short; the third quill longest. Tail as in the *Coccyzina*, or very long, broad, and graduated throughout, with broad ends to the feathers. Legs and feet suited for perching only, and slender: tarse equal to the thumb: toes long and slender, flat-soled, the inner and hind bordered, and unequal all: nails large, simple. Rump spinous.

“Type. *C. tusalia*, Hodgson. Head and neck as in the common wild Pigeon, with golden-green gloss on latter. Above, brown-black, cross-barred with chestnut (in young?); below, rufescent-luteous with frequent dusky cross-bars. Alars blackish. Central caudals like back; laterals plumbeous with broad dark bar as in the wild Pigeon. Legs, orbits, lores, and cere, red: bill black. Length sixteen inches and a half: bill to gape one inch: tail eight inches and a half: wing seven inches and a half: tarse to sole fifteen-sixteenths of an inch: central toe and nail one inch and seven-sixteenths; hind fifteen-sixteenths of an inch. Solitary, and a deep forester: not found in the plains.

“Remark.—This form, like Swainson's *Ptilinopus* and our *Dendrotreron* [Col. Hodgsonii, Vigors, P. Z. S. 1832, p. 16], serves to connect the *Columbina* or Insessorial or typical Pigeons with the *Vinagina* (or dentirostral?) or tree Pigeons. It has much the aspect of a Cuckoo, and the tail exactly of the *Coccyzina*, the bill of *Columba* proper, and the feet nearly of *Ptilinopus*. It represents *Geopelia* of the *Ptylophyrina* or rasorial Pigeons (ground *Columbines*), and is closely allied to, if not a subgenus of, *Macropygia*.”

Sitta formosa, Nobis. This very beautiful bird appears to present no sufficient distinction upon which it could be separated from the ordinary Nuthatches, though the style of colouring of its upper-parts is peculiar, and its size also is comparatively large: the relative length of its wing-primaries may, however, be different; but these were in process of renewal in the specimen before me. Length about seven inches and a half, of wing four inches, and tail two inches and a quarter; bill to forehead (through the frontal plumes) seven-eighths of an inch; tarse three-quarters of an inch; and hind-toe and claw an inch. Colour of the upper-parts black, beautifully variegated with different shades of ultramarine-blue; the scapularies and rump verdigris; and the wing-coverts and tertiaries elegantly margined with white at their tips: under-parts bright rusty-fulvous, somewhat paler on the breast, and inclining to albescent on the throat: the frontal feathers are tipped with white, and around the eye also is whitish, continued backward as an ill-defined supercilium tinged with fulvous posterior to the eye: crown and back deep black, each feather tipped with brilliant ultramarine, forming large and pointed triangular spots; on the back these incline more to verdigris, and are dilute and whitish over the shoulder: wing-coverts black, with strongly contrasting terminal white margins as described, and more or less laterally edged, as are also the large alars, with bright lavender-blue, which likewise appears within the white margin of the tertiaries, and tips their inner-webs; middle tail-feathers lavender-blue, with black mesial line, the rest black edged externally with blue, and tipped with duller blue, the outermost having a large white spot at the extremity of its inner web, and the next a smaller terminal spot of the same. "Irides dark: bill blackish, the lower mandible pale underneath: and legs greenish horny, with yellow soles."

Kitta venatorius (var.?). Entirely resembles the ordinary *K. venatorius* in form and proportions, but the colour beautiful deep sea-green, the head a more yellowish-green, and a distinct tinge of yellow on the sides of the forehead, above the broad black streak through the eyes; wings sanguineous, brightest on the secondaries and outer margin of the tertiaries, the latter having the subterminal black bands and verdigris tips strongly defined. "Iris hazel; legs, bill, and eyelids, vermillion." The rump of this most beautiful specimen inclines a little to the usual verdigris-blue of the species, and there is also a

slight admixture of the same here and there upon the back and especially on the scapularies. The specimen is a male, and I conceive it to exhibit merely the thoroughly mature dress of its species. Of several examples before me in ordinary attire, both adult and young, not any present a decided admixture of green on the plumage, and one only (a young bird from Tenasserim) has the wings rusty-sanguineous, others exhibiting more or less trace of the same, chiefly on the interior of the feathers, the rest being dingy greyish. I also observe that in the golden-winged species of the genus *Garrulax* (v. *Crateopus*), as *G. chrysopterus*, *affinis*, &c., the analogous yellow colour is similarly convertible to dull greyish, which occasionally margins the feathers, concealing the brighter tint within.

Muscicapula, Nobis. n. g. The members of this group are nearly allied to *Dimorpha* (olim *Siphya*), Hodgson, *Ind. Rev.* 1839, p. 651, from which they are chiefly distinguished by their small size and feeble legs and toes, the latter approaching them nearer to the Flycatchers. The brilliant colouring of the first allies it to restricted *Chaitaris* (olim *Niltava*), Hodgson, and also to the group exemplified by *Phœnicura rubeculoides* of Vigors and Gould, which now that I have three species appertaining to it, I venture to separate from *Chaitaris*, to which Mr. Hodgson formerly referred the *rubeculoides*. The following four are referrible to the present division:—

1. *M. sapphira*; *Muscicapa sapphira*, Tickell, *M. S.* Length five inches, of wing two inches and a half, and tail an inch and seven-eighths; bill to gape nine-sixteenths of an inch, and tarse five-eighths of an inch. Colour of the upper-parts rich dark purplish-blue, inclining to ultramarine on the rump and upper tail-coverts; forehead and crown vivid smalt-blue; the lores black; fore-neck and breast rich purple, with a broad median line of deep and bright ferruginous; flanks greyish, the belly and fore-part of the wings underneath, with the axillaries, white; alars and tail black edged with blue externally. Bill and feet black. Unlike the three following species, the *M. sapphira* has no white at the base of its tail externally. Procured at Darjeeling.

2. *M. superciliaris*; *Muscicapa superciliaris*, Jerdon, *Madr. Jl.* XI, 16: *Dimorpha albogularis*, Nobis, *J. A. S.* XI, 190. Himalaya, and has been obtained also in Central and Southern India.

3. *M. melanoleuca*, Nobis, Hodgson. Length four inches and a half, of wing two inches and a quarter to two and three-eighths, and tail an inch and seven-eighths; bill to gape nine-sixteenths of an inch, and tarse half an inch. Colour wholly black and white: the upper-parts black, with a broad white eye-streak, and broad longitudinal mark of the same upon the wings, commencing on the coverts of the secondaries and continued along the margin of the tertiaries, which in some are further edged with white round their tips; under-parts also white, and basal half or more of the outer tail-feathers. Bill and feet black. Nepal, Darjeeling.

4. *M. rubecula*, Nobis; *Dimorpha superciliaris*, Nobis, *J. A. S.* XI, 190, which specific name must now be transferred to the second species. Nepal, Darjeeling.

Of true *Dimorpha*, Hodgson, I know of only two species; viz.

1. *D. strophinata*, Hodgson, upon which the group was founded: and

2. *D. auricularis*; *Chaitaris auricularis*, Hodgson, *M. S.*: which has the cœrulean spot on the sides of the neck common to the species of restricted *Chaitaris*, but the rest of its plumage is plain dull olive, rufescent on the wings and tail, and slightly on the rump, the under-parts paler and inclining to whitish on the belly. Length about five inches, of wing two inches and a half, and tail two inches; bill to gape nine-sixteenths of an inch, and tarse five-eighths of an inch. Inhabits Nepal and Assam.

Very closely allied to these is the *Muscicapa leucura*, Gm., the adult male of which is *Saxicola rubeculoides* of Sykes: but Mr. Hodgson makes a separate group of it, though it scarcely differs except in having the first primary less developed and the second more so.

Of true *Chaitaris*, I know of three species; viz.

1. *Ch. grandis*, Nobis, *J. A. S.* XI, 189. Common at Darjeeling.

2. *Ch. sundara*, Hodgson, *Ind. Rev.* 1837, p. 651. Also common at Darjeeling and in Nepal: and

3. *Ch. McGregorii*; *Phœnicura McGregorii*, Burton, *P. Z. S.* 1835, p. 152; *Ch. fuligiventer*, Hodgson. Himalaya. The following species I separate by the appellation

Cyornis, Nobis: having the bill less compressed, the tarsi shorter and together with the toes more feeble, and altogether partaking more

of the Flycatcher form; they also have not the brilliant cœrulean spot on the sides of the neck conspicuous in the foregoing group.

1. *C. rubeculoides*; *Phœnicura rubeculoides*, Vigors, *P. Z. S.* 1831, p. 35; *Chaitaris brevipes*, Hodgson. Himalaya, and visits the neighbourhood of Calcutta during the cold season, where I have obtained several specimens; but I have never seen it from the Indian peninsula.

2. *C. banyumas*; *Muscicapa banyumas*, Horsfield; *M. cantatrix*, Temminck; *M. aurea*? Lev.,* which name would hold precedence; *M. rubecula*, Swainson, *Nat. Libr.*, the female. Southern India and Malay countries.

3. *C. Tickelliae*, Nobis; *M. hyacintha*, Tem., apud Tickell, *J. A. S.* II. 574. Of a more greyish* blue than the preceding species on the upper-parts, brightening on the forehead, shoulders of the wings, and upper tail-coverts; throat and breast light ferruginous, the belly albescent, and under tail-coverts pure white; the rufescent medial portion of the throat much broader than in the preceding species. Length five inches and three-quarters, of wing two inches and three-quarters, and tail two inches and a half; bill to gape eleven-sixteenths of an inch, and tarse five-eighths of an inch. Bill blackish; legs pale. Inhabits Central India.†

* I have somewhere seen this identified with *M. cantatrix*.

† Add 4. *C. unicolor*, Nobis. Vide *Addenda to Appendix* of present Report. I annex identifications of most of Capt. Tickell's other species, described in the same paper.

No. 1, *Hyptiopus lophotes*; 2, *Circus æruginosus*; 3, *C. melanoleucos*, young; 4, a good species; 5, *Ketupa Leschenaultii*; 6, *Strix longimembris* (?), Jerdon; 7, *Athene radiatus*, (Tickell), — *erythropterus*, Gould, — *perlineatus*, Hodgson; 8, *Ninox scutulatus* (Raffles), v. *hirsutus* (Tem.); 9, *Ceblepyris melaschistos*; 10, *Tricophorus virescens*, Jerdon, v. *Ixos Psidii*, apud nos, p. 181* ante; 11, *Dicrurus cœrulescens*; 12, *Tephrodornis superciliosus*; 13, *Brachypus melanocephalus* of Hardwicke and Gray, vide *J. A. S.* XI, 792; 14, *Cometes krishna*; 15, *Muscicapa picata*; 16, *Pericrocotus princeps*; 17, *Cyornis Tickelliae*, Nobis, supra; 18, 19, the names refer to the same, *Muscicapa cœrulea*, Vieillot; 20, — ?; 21, *Pericrocotus peregrinus*; 22, *Saxicola caprata* (?); 23, *Copsychus saularis*; 24, *C. macrourus*, — *Kittacincla* of Gould; 25, *Cyanecula Suecica*; 26, *Calliope Lathamii*; 27, probably *Mixornis* (Hodgson) *chloris*, vide XI, 794; 28, — ?; 29, *Prinia macroura*; 30, *Sylvia Indica*, apud Jerdon; 31, — ?; 32, *Thamnobia fulicata*; 33, *Iora typhia*; 34, *Geocichla citrina*; 35, a good species; 36, *Oriolus Hodgsonii*, Sw., young male; 37, *Nectarinia Goalpariensis*; 38, *Dicaeum Tickelliae*, Nobis; 39, *Chloropsis cœsmarhynchos*, vide p. 956; 40, probably *Emberiza fucosa*, *J. A. S.* XI, 601; 41, *Spermestes leuconotus*; 42, *Parisoma vireoides* of Jerdon's list; 43, *Pyrgita concolor*? ditto; 44, *Pyrgita flavicollis*; 45, *Picus Goensis*, fœm.; 46,

To these must be approximated *Saxicola nigrorufa*, Jerdon, *Madr. Jl.* 1842, p. 189; vel *Muscicapa rufula*, de la Fresnaye, Ad. Delessert, *Souvenirs*, &c., pt. ii, 29; which probably will be eventually found to exemplify another of these small natural divisions, intermediate to the last and to the Stonechats.]

I shall now refer to my former paper on a collection of birds from the same locality (Vol. XI. p. 160, *et seq.*), certain of which, introduced as new, I have since succeeded in identifying with previous descriptions, and some of my efforts at monographing various groups I can now render more complete, from having subsequently received accessions, more or less considerable, to the number of their comprised species.

Vol. XI, p. 160. *Falco Aldrovandi*, v. *severus*, Horsfield. The Darjeeling male appears to have been rightly assigned to this species; but the supposed female and young are distinct: and the Neilgherry small Falcon mentioned in a note to p. 162, proved to be *F. vespertinus* v. *rufipes*, vide p. p. 881-2.*

P. 165. Several small Owls are mentioned, of which the *Strix scutulata*, Raffles, *Str. hirsuta*, Temminck, *Str. lugubris*, Tickell, and it may be added *Ninox Nipalensis*, Hodgson, are one and the same.

P. 166. I have deemed it worth while to publish a figure of the Yellow-backed Honeyguide (*Indicator xanthonotus*, Nobis), which will shew that that species is correctly referred to its genus, of which it was assuredly little suspected that any representative would inhabit the Himalaya.

P. 168. *Cuculus micropterus*. In my description of this Cuckoo (*J. A. S.* XI, 903), I considered certain dark ash-coloured specimens to be merely the old birds of this species, an opinion to which I still adhere. Mr. Hodgson, however, thinks differently, having lately forwarded similar examples by the designation *C. saturatus*. One sent as the

P. aurantius; 47, *P. Mahrattensis*; 48, *Dendrophila frontalis*, v. *Sitta corallina*, Hodgson; 49, *Buceros Malabaricus* verus; 50, correct; 51, probably a species closely allied to *Bucco viridis*, v. *caniceps*, of which I have information; 52, *Trogon Malabaricus*?; 53, *Caprimulgus* — ?; 54, *Macropteryx longipennis*; 55, *Carpophaga aenea*; 56, *Columba meena*; 57, 58, 59, correct; 60, *Parra Indica*, immature.

* The *Falco Aldrovandi* has recently been described in McClelland's Journal, (1843, page 283,) as *F. rufipedoides*. *F. vespertinus* I have lately obtained in this neighbourhood.

young appears to me to be a female in the plumage corresponding to the *hepaticus* variety of *C. canorus*, which is so prevalent also in the following species.

Same page. For *Cuculus Sonneratii*, read *C. poliocephalus*, Latham, vide p. 904. Both of these species (i. e. *micropterus* and *poliocephalus*) have recently been obtained in southern India by Mr. Jerdon.

Mr. Hodgson has also forwarded an apparently distinct species by the appellation *C. nisicolor*, to which I have no hesitation in referring the young specimen from Macao mentioned in a note to p. 240, *ante*. It is closely allied to *C. fugax*, from which it is chiefly or wholly distinguished by its much deeper colouring. Mr. Hodgson's example would appear to be a remarkably small one, and is probably a female; but the difference of size between it and the young specimen from Macao is not greater than occurs in the respective series of *C. canorus* and *C. micropterus* now lying before me. Length about twelve inches and a half, of wing six inches and five-eighths, and middle tail-feathers five inches and three-quarters; bill to gape an inch and three-sixteenths. Colour of the upper-parts very dark pure ash-colour; throat and cheeks the same, as in *C. fugax*: under-parts and tail also as in the latter species; but the flanks not barred (in the specimen): throat below the chin contrasting with the dark ashy above and laterally, and the central marking of the feathers of the throat deep ash, like the rest of this colour, it being very dark on those of the fore-neck. The Macao specimen is moulting its tail-feathers, but has the wing seven inches and a half long, being probably a young male. Cap, with the throat, ear-coverts, and sides of the neck, very dark ashy, and several white feathers on the nape, as in some young examples of *C. fugax*; interscapularies dusky ash, very faintly rufous-barred, imparting a shade of that colour to the part; scapularies, tertiaries, and wing-coverts, successively more distinctly barred with bright rufous; the fore-neck tinged and the plumage of the breast tipped with the same; and the under-parts longitudinally streaked throughout with dusky, shewing no trace of bars on the flanks: lower tail-coverts dull white: bill and feet as in *C. fugax*.

Since the Supplement to my Monograph on Cuckoos was published (p. 240 *ante*), Mr. Jerdon has favored me with copies of the descriptions of *Cuculidae* in Lesson's *Traité*. The *C. fugax* is there des-

cribed by the specific name *tenuirostris*, which term is applied by Gray in Hardwicke's Illustrations to the female of *C. niger*. *C. flavus* is described from Bengal and Java, the *niger* being thus regarded as identical with it (vide p. 241 *ante*) and a variety (?) is mentioned, only half the size, but presenting no other difference. There is also described a *C. lineatus*: "like *C. flavus*, but larger; above brown-grey, darkest on wings and back; beneath rufous, barred with black; tail brown above, edged with white beneath. East Indian Isles."

The *C. (Chrysococcyx) lucidus*, (vide XI, 917,) would appear to be Himalayan. At least a specimen occurs in a collection formed partly in the Himalaya, and partly in central India, presented to the Society by C. Fraser, Esq.; and a member of this group is mentioned in a catalogue of Nepalese birds forwarded by Mr. Hodgson.

C. (Chrysococcyx) chalcites? (XI, 919). A specimen which I presume to be the adult male of this species, from Macao, considerably resembles the young of *C. lucidus*, and may be described as follows. Length about five inches and three-quarters, of wing three inches and a half only, and tail two inches and a half; bill to gape three-quarters of an inch, and tarse exceeding half an inch, being feathered for only the upper third. Upper-parts metallic green, not very vivid, and much bronzed: lower-parts white, transversely barred with the colour above: tail having an obscure subterminal dusky bar, beyond which, on the extremity of the inner web of each feather save the middle pair, is a white spot; the rest of the inner webs of the outer tail-feathers are barred black and white, successively less defined and more tinged with rufous as they approach the middle pair: bill blackish, with some yellow at the base of the upper mandible; and legs also dark.

To return to M. Lesson's Cuckoos, it appears that *Phœnicophæus calorhynchus* (*J. A. S.* XI, 1098,) is identical with *Zanclostomus Javanicus*; and the *Piaya erythrorhyncha*, Lesson, would seem to be referrible to the same. *Taccocœa Leschenaultii* appears to be identical with *Zanclostomus sirkee*. The *Phœnicophæus lucidus*, Vigors, *Ph.*

• Two specimens from Chusan differ only from the Indian bird in their rather smaller size, though the beak appears fully as large. Both are in the plumage which I have described as the second dress of the male *C. niger*, having the under-parts rufous from the breast, and one of them retaining some of the barred nestling feathers upon its wings. Length of the wings (in both) four inches, and of tail four inches and one-eighth. Of the Bengal bird, I have recently obtained female speci-

Crawfurdi, Gray, and *Calobates radiceus*, Temminck, I have still no means of referring to.

Of *Centropus Phillipensis*, M. Lesson mentions a variety (?) from Sumatra, only half the usual size: body above dull brownish-black; wings dirty rufous.* His young or female from Bengal would seem to be a state of plumage of *C. lepidus*: "size of a Magpie; plumage brown, spotted and zoned with blackish brown, streaked with white on the fore-part of the neck; tail brown above, rayed with whitish." *C. pumilus* is doubtless *C. Bengalensis*, Latham, thus described from specimens in the Paris Museum: "Male size of a Thrush; bill black with a white spot; tarsi brown; plumage brown-black tinted with rufous; tail wedged, broad, brown: from Java (!): female—a little larger

mens in the green-glossed dark ashy plumage, with ferruginous under-parts from the breast, one of them having the latter much brighter than in any male I have yet seen, the feathers of its breast being also partially tipped with the same; another female with uniformly dark upper-parts, has the entire under-parts scantily banded with dull rufous, and traces of the same also on the forehead and above the eyes; a third female tends towards the *hepaticus* variety of plumage, having the upper-parts dark, with rufous bars, which are darker and less conspicuous on the back and scapularies, but vivid and strongly marked on the wing-coverts and tail, the rump dark with faint traces of rufous, and the entire under-parts pale and weak ferruginous, with narrow dusky cross-bars, except on the under tail-coverts and towards the vent; a fourth female, in the true *hepaticus* plumage, with a ferruginous rump, is that described as exhibiting the mature female livery, in XI, 909. Well may M. Lesson designate this bird (or an allied smaller species resembling it) a "perfect Proteus."

* Such a specimen I have now before me from Chusan, of the size and with the form of beak of *C. lepidus*, but the colouring of *C. Phillipensis*, only the rufous is not so bright, being washed with fuscous especially on the tertiaries, and the stems of the dorsal feathers are more coarsely spinous and glistening. Length about fourteen inches, of which the middle tail-feathers measure seven and a half, the outermost nearly four inches less; wing six inches: bill to gape an inch and one-eighth, and nine-sixteenths of an inch in greatest vertical depth; tarse an inch and a half; and long hind-toe and claw an inch and three-fourths. Should this not be named, I propose to designate it *C. dimidiatus*.

C. lepidus extends into Nepál, a specimen from that country having been forwarded by Mr. Hodgson; and an example of the young in first plumage, from the Malay peninsula, may be described as follows:—Upper-parts light chestnut, handsomely barred with black, these bars more narrow on the wing-coverts, primaries and secondaries; tail green-glossed black, with narrow rufous cross-bars; crown and neck above longitudinally striated, the spinous shafts of the feathers little developed, and their lateral margins black: under-parts pale fulvescent, with slight dusky barring on the flanks, and spots of the same on the sides of the neck: bill pale yellowish-horn, the ridge of the upper mandible reddish-brown. M. Lesson's Bengal specimens above noticed would not appear to differ materially.



than the male; bill horny: plumage reddish white, rayed with brown; wings bright rufous; tail long, much wedged, brown, edged with reddish-white: Sumatra.

"*Centropus bicolor*; Paris Museum. Bill and tarsi black: plumage smoky greyish-white, darkest on head, back, and wings, brightest on throat and breast; belly and anal region tinted with reddish-ochreous: tail cinnamon-rufous. Celebes, Moluccas.

"*C. melanops*; Paris Museum. Size of *C. Senegalensis*: bill and tarsi black: forehead, cheeks, and around the eyes, intense black; throat white; neck and breast ferruginous; abdomen and anal region dull black; back rust-coloured; wings chocolate; tail bluish-black. Java."*

P. 169 *et seq.* For a more complete monographic notice of the Indian Drongos, vide p. 799 *et seq.*, also p. 180 (*bis*) of the present volume. Mr. Hodgson has, however, sent specimens of *Dicrurus bali-cassius* verus, as his *annectans*; and has also forwarded from Nepál *D. Fingah*, *macrocircus*, and *cærulescens*.

P. 175. The following is a more complete list of the species of *Pomatorhinus*.

1. *P. erythrogyne*, Vigors, *P. Z. S.* 1831, p. 137, and figured in Gould's *Century*, pl. LV. Himalaya.

2. *P. montanus*, Horsfield, *Lin. Trans.* XIII, 165, and figured in the 'Zoological Researches in Java' of that naturalist. Java.

3. *P. schisticeps*, Hodgson, *As. Res.* XIX, 181; *P. leucogaster*, Gould, *P. Z. S.* 1837, p. 137. Himalaya, Assam.

4. *P. Horsfieldi*, Sykes, *P. Z. S.* 1832, p. 89. Neilgherries.

5. *P. ruficollis*, Hodgson, *As. Res.* XIX, 182. Himalaya.

6. *P. trivirgatus*, Temminck, *Pl. Col.* 443; figured also in the 'Illustrations of Ornithology' of Sir W. Jardine and Mr. Selby, pl. LXIX. Australia.

7. *P. turdinus*, Temminck, *Pl. Col.* 441. Australia. *P. 4th, VII, 355*

8. *P. temporalis*, Vigors and Horsfield, *Lin. Trans.* XV, 330. Australia.

9. *P. superciliosus*, Vigors and Horsfield, *Ibid.* Australia. *P. 4th, VII, 355*

10. *P. rubecula*, Gould, *P. Z. S.* 1837, p. 137. Australia.

* For further descriptions of Asiatic *Cuculidæ*, vide XI, 897 and 1095, also p. 240, ante.

11?. *P. frivolus*; *Turdus frivolus*, Latham, Vieillot; Australia: referred to this genus by Mr. G. R. Gray, *Mag. Nat. Hist.* 1843, p. 192. The Mexican *Orpheus longirostris*, Swainson, is strangely referred to *Pomatorhinus* by M. Temminck in his *Planches coloriées*, vide *Fauna Americana-borealis*, II. 191. Probably one of the subsequently described Australian species will prove identical with *P. frivolus*; this genus having been originally constituted upon a single species.

In Dr. Horsfield's catalogue of the Assamese birds procured by Dr. McClelland, *P. Z. S.* 1839, p. 166, *P. montanus* is included, with the remark that "no essential difference is apparent between a specimen of this bird sent from Assam and the specimens obtained in the Island of Java, from which the original description was made." A drawing, however, in Dr. McClelland's possession, taken from the only specimen of this genus which was procured by him, refers distinctly to *P. schisticeps*; a species which undoubtedly is nearly allied to *P. montanus*, as is also the *P. Horsfieldi*, but all three present constant differential characters, as follow:—

In *P. montanus*, the whole back and scapularies, with the nape, are bright chestnut-rufous; crown and sides of the head schistaceous; and a superciliary streak reaching to the occiput, with the entire under-parts to near the vent, vivid white, the latter flanked with rufous.

In *P. schisticeps*, the rufous is confined to the immediate border of the white under-parts; the neck, back, and scapularies, being wholly olivaceous: in other respects like the preceding. The young, too, present no difference of colour, further than that the crown is browner; their wings and tail being also shorter, and the clothing plumage flimsy, at least in part.

In *P. Horsfieldi*, the rufous is constantly wanting altogether, besides which the white extends but little beyond the breast, which is flanked with dusky: in other respects it resembles both the others.

The geographic locations of these three species are different; and the Himalayan *P. schisticeps* is the most likely of them to occur in Assam.

Same page. My genus *Xiphirhynchus* being identical in name with Mr. Swainson's *Ziphorhynchus*, I change it to *Xiphorhamphus*, and supply a figure of the species upon which it is founded.

P. 177. I also give a representation of *Paradoxornis ruficeps*; but regret to add that the artist (for whom I furnished a rough sketch) has

made it look rather too large, from the hardness of the back-outline in particular, the feet are coarse and ill-drawn, and the wing from bend should be three-eighths of an inch longer, the addition being made in front. This species occurs at Darjeeling.

P. 178, *et seq.* Genus *Garrulax*, Lesson; *Crateropus*, Swainson; *Ianthocincla*, Gould; *Cinclosoma* (in part), Vigors, Hodgson. During the short time that has elapsed since I published a synopsis of the species of this genus then known to me, the Society's Museum has been greatly enriched by a splendid donation from Mr. Hodgson, which comprised most of the species described by that naturalist, and brought the number of those contained in the Society's collection to fifteen, exclusive of *Nipalensis*, which Mr. Hodgson has since classed in his genus *Alcopus* (olim *Sibia*), vide *J. A. S.* VIII, 38, but now founds upon it his genus *Ixops*. The Society has since also received the Neilgherry *G. cachinnans* from Mr. Jerdon, and a new species from Capt. Phayre, Commissioner of Arracan. By some oversight, I omitted on that occasion to include the *G. setafer*, Hodgson; and now that this gentleman has supplied the Society with specimens of the bird so named by him, I find that a Bootan species in the museum which I had doubtfully identified with it, though nearly allied, is distinct from it, besides which are other new species comprised in the following conspectus of the oriental members of this group, with which I am at present acquainted.

1. *G. leucolophos*; *Corvus leucolophos*, Gmelin: figured in Gould's *Century*, Pl. XVIII. Himalaya.

2. *G. Belangeri*, Lesson, *Zoologie du Voyage de M. Bélanger*, p. 258, with coloured figure: *Ianthocincla leucolophos*?, Var., Nobis, *J. A. S.*, X, 924. Common in the Tenasserim provinces, and procured by M. Bélanger in Pegu.

3. *G. rufifrons*, Lesson, *Ibid.*, with also a coloured figure. Java.

4. *G. perspicillatus*, G. R. Gray; *Turdus perspicillatus*, Gmelin, — Shaw's *Zoology*, X. 325: *le Merle de la Chine*, Buffon. China.*

5. *G. auritus*; *Corvus auritus*, Latham; *Spreo auritus*, Lesson, *Traité†*: *Crateropus leucogenys*, Nobis, *J. A. S.* XI, 180; *le petit*

* Mr. G. R. Gray appears to consider this as identical with *G. Belangeri*, but Shaw's description of it would hardly seem to apply to the latter.

† *Spreo* of Lesson is founded on *Turdus bicolor* of Gmelin, apud G. R. Gray.

Geai de la Chine, Sonnerat. The specimen described by me was brought, as I have since learned, from China, which is the habitat assigned to the species. *Vide* p. 179 (*bis*) *ante*, for some particulars concerning the individual as observed in captivity.

6. *G. Reinwardii*; *Crateropus Reinwardii*, Swainson, *Ill. Zool.*, 2nd series, II. pl. LXXX. Believed to be Malayan.

7. *G. albogularis*; *Ianthocincla albogularis*, Gould, *P. Z. S.* 1835, p. 187; *Cinclosoma albigula*, Hodgson, *As. Res.* XIX, 146. Nepâl, Bootan.

8. *G. gularis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 159. Assam.

9. *G. pectoralis*, Gould, *P. Z. S.* 1835, p. 186; *Cincl. grisaure*, Hodgson, *As. Res.* XIX, 146. Nepâl.

10. *G. moniliger*; *Cincl. moniliger*, Hodgson, *As. Res.* XIX, 147. Not readily distinguishable from the preceding species, but inferior to it in size, having the wing considerably shorter, the breast-marking generally less developed, and the tail-feathers less deeply tipped with white; the ear-coverts also have less white on them, which is confined to their lower and central portion. Nepâl, Bootan.

11. *G. melanotis*, Nobis. Still more nearly allied to *G. pectoralis*, but having the ear-coverts wholly black, forming a large and conspicuous patch; whereas in the other they are silvery-white, slightly surrounded with black; the lateral tail-feathers are also still more deeply tipped with white, and the uppermost longest tertiaries have a white spot on their inner web. Arracan.

12. *G. McClellandii*, Nobis; *Ianthocincla pectoralis*, Gould, apud Horsfield, *P. Z. S.* 1839, p. 160. Assam. Neither in Dr. McClelland's description of this bird (*loc. cit.*), nor in his coloured drawing of it, is any notice taken of the bright rufous nape of the three foregoing species, nor of the white streak edged inferiorly with black over the eye, nor of the conspicuous whitish ear-coverts of *G. pectoralis*, nor of the greyish-white edgings to the outer primaries; the whole of which are much too obvious to be overlooked in that species. Hence I feel little doubt that the present is a different bird from either of its foregoing nearly allied congeners.

13. *G. lunaris*; *Ianthocincla lunaris*, McClelland and Horsfield, *P. Z. S.* 1839, p. 160. Assam. *Same as next*

14. *G. [ruficollis ;] Corvus pubdya*, Buchanan Hamilton. Nearly allied to the last, which it resembles in the semi-lunar mark on the sides of the neck. Length about nine inches and a half. General colour olivaceous-brown, darkening on the tail, and passing into ash-colour on the crown and occiput: forehead, ear-coverts (including the orbital region), throat, and fore-neck, black: a crescent-like mark of rufous on the sides of the neck, and under tail-coverts the same. Irides red. Bill black; and legs dusky. Described from a beautiful and highly finished drawing, sketched evidently from life, among those of the late Dr. Buchanan Hamilton. Habitat not stated.*

15. *G. variegatus ; Cincl. variegatum*, Vigors, *P. Z. S.* 1831, p. 55, and figured in Gould's *Century*, Pl. XVI. Nepál.

16. *G. affinis*, Hodgson. *M. S.* Nearly allied both to the last, and (judging from description) to the next species. Length about ten inches, of wing four inches, and middle tail-feathers four inches and three-quarters, the outermost an inch and a half shorter; bill to forehead (through the feathers) an inch, and to gape an inch and one eighth; tarse an inch and a half. General colour rufescent olive-brown, more or less distinctly mottled on the back with paler tips to the feathers; the rump dingy greenish, and upper tail-coverts rufous: sides of the head, lores, cheeks, and ear-coverts, black, occasionally suffusing the crown; chin the same, and a broad moustachial spot, with another behind the ears, white: breast rufous-brown, the feathers laterally edged with grey; belly uniform fainter rufous-brown, and lower tail-coverts darker: the wings have a jetty-black spot, formed by the coverts of the primaries; and the winglet, with the exterior margins of the primaries, is pearl-grey; those of the secondaries and tertiaries partly are greenish-yellow, much as in *G. chrysopterus*, the remainder of the tertiaries and tips of the secondaries being slaty-grey; anterior portion of the wing coloured like the back; and basal two-thirds of the tail dull greenish-orange, the rest slaty-grey: bill black, and feet pale brown. Inhabits Nepál.

* This would seem to be the *Ianthocincla ruficollis* of Jardine and Selby's 2nd series of Illustrations, which I have not seen; to judge from the following diagnosis sent me by Mr. Jerdon. "*I. fronte, genis, auriculis, gulá, superiore pectoris, nigris; capite superiore colli griseis; lateribus colli crissoque rufis: colore colli maculá curvatá extendente ad gulam, corpore alisque olivaceo-griseis, remigibus marginibus griseis; caudá nigrescente. Hab. Himalayas.*"

17. *G. capistratus*; *Cincl. capistratum*, Vigors, *P. Z. S.* 1831, p. 55. Himalaya.

18. *G. chrysopterus*; *Ianth. chrysoptera*, Gould, *P. Z. S.* 1835, p. 48. Bootan, Nepâl.

19. *G. erythrocephalus*; *Cincl. erythrocephalus*, Vigors, *P. Z. S.* 1831, p. 171, and figured in Gould's *Century*, pl. XVII. Nepâl.

20. *G. rufogularis*; *Ianth. rufogularis*, Gould, *P. Z. S.* 1835, p. 48: *Cincl. rufimenta*, Hodgson, *As. Res.* XIX, 148. Nepâl.

21. *G. ocellatus*; *Cincl. ocellatum*, Vigors, *P. Z. S.* 1831, p. 55, and figured in Gould's *Century*, pl. XV. Nepâl.

22. *G. squamatus*; *Ianth. squamata*, Gould, *P. Z. S.* 1835, p. 48, and figured in Jardine and Selby's 2nd series of *Illustrations*: *Cincl. melanura*, Hodgson, *As. Res.* XIX, 147. Nepâl.

23. *G. cœrulatus*; *Cincl. cœrulatium*, Hodgson, *As. Res.* XIX, 147. Nepâl.

24. *G. [phœniceus; *]* *Crateropus puniceus*, Nobis, *J. A. S.* XI, 180. Bootan, Darjeeling.

25. *G. lineatus*; *Cincl. lineatum*, Vigors, *P. Z. S.* 1831, p. 55. Nepâl?

26. *G. setafer*; *Cincl. setaferum*, Hodgson, *As. Res.* XIX, 148. Nepâl.

27. *G. imbricatus*, Nobis. Length eight inches and a half; of wing three inches; and middle tail-feathers four inches, the outermost an inch and a quarter less: bill to forehead (through the feathers) three-quarters of an inch, and to gape seven-eighths of an inch: tarse an inch and one-eighth. General colour olive-brown, darker on the crown, paler and a little inclining to rufous underneath; the rump and flanks dingy olive-green; and tail slightly rufescent above, its exterior feathers successively more broadly sub-terminated with dull black, having their extreme ends whitish: plumage of the head, neck, and back, slightly rigid to the feel, recalling to mind that of a Coucal (*Centropus*), which is also the case, in a slighter degree, in the preceding species, more particularly on its crown: the feathers of the crown and neck have shining black shafts, and, together with those of the nape, are slightly margined with dull olive-green; lores albescent, and the ear-coverts, sides of the neck, and under-parts, are more or less white-

* Mr. Jerdon informs me that this bird is the *Xanthocincla phœnicea* of Gould, figured in his *Icones Avium*.

shafted, chiefly towards the tips of the feathers; primaries inconspicuously margined with grey, and secondaries with yellowish-olive: bill and feet olive-brown. Inhabits Bootan.

28. *G. cachinnans*; *Crateropus cachinnans*, Jerdon, *Madr. Jl.* No. XXV, 255 (1839), and there figured: *Cr. Lafresnayii*, Ad. Delessert, *Souvenirs d'un Voyage dans l'Inde*, pt. II, 30; and, it would appear, *Cr. Delesserti*, de la Fresnaye, *Rev. Zool. par la Soc. Cuvierenne*. Neilgherries.*

29. *G. Delesserti*; *Crateropus Delesserti*, Jerdon, *Madr. Jl.* No. XXV, 256 (1839): *Cr. griseiceps*, Ad. Delessert, *Rev. Zool. par la Soc. Cuv.* 1840, p. 101, and Deless. *Souvenirs*, &c. pt. II, 29. Neilgherries.

30? and 31? In the catalogue of Dr. Royle's birds procured at Saharunpore and the neighbouring districts of the Himalaya, *G. leucolophos* is noticed as inhabiting the lower hills, and two other species are mentioned of which I have seen no description; viz. *melanocephalus*, on the hills, and *striatus*, met with in the Kheree Pass. Whether these be distinct from all the foregoing, remains to be ascertained.*

* In a list of specimens now on their way from Mr. Hodgson, I find three species mentioned, by the names *leucopophus* (*Quere leucolophos*), *erythropterus*, and *subunicolor*; this last, with *setafer* and others, constituting Mr. Hodgson's division *Trochalopteron*, the propriety of adopting which name will depend on whether Mr. Swainson's *Crateropus Reinwardii* be considered admissible into the group, in which case it must bear the appellation *Crateropus*.

The specimens adverted to have since arrived, but *Tr. leucopophus* (?) and *erythropterus* are not among them; and of *Tr. subunicolor*, a nestling specimen only is sent, of a species nearly allied to *Tr. erythrocephalus*, *chrysopterus*, and *affinis*, especially to the latter, but having a shorter and thicker bill than in that bird. In a nestling example of *Tr. chrysopterus* before me, the lunate black spots on the breast of the adult do not exist, beyond a mere trace of them on the sides of the breast; being the contrary of what is observable in the Thrush and various other groups, wherein the young are more mottled than the adults. Length of the immature *subunicolor* about nine inches, of the wing three inches and a half, and tail four inches; bill to gape seven-eighths of an inch, and tarse an inch and three-eighths. General colour greenish olive-brown, tinged with dusky on the head, and brighter greenish on the tertiaries and tail, the latter having a slight wash of aureous; exterior tail-feathers dusky with white tips, the latter successively increasing to the outermost; edges of primaries bright golden-yellow, as in *affinis*, but the narrow exterior edge of the outer primaries greyish beyond their emargination; lower-parts dull olive-brown: the dorsal plumage is slightly margined with black, in the adults probably as much so as in *squamatus*; and two or three new feathers growing on the breast are whitish towards the tip with a dusky margin, indicating that the under-parts of the adult would be thus mottled: bill dusky above, the under mandible yellowish except at tip; and feet brown. Nepal.

The only additional species which I at present know of, are four described from Western Africa by Mr. Swainson, and one discovered in Southern Africa by Dr. A. Smith:* there are doubtless, however, several more yet to be discovered in this country. Of those here enumerated, Nos. 3, 4, 6, 8, 12, 13, 14, 15, 17, 25, and 29, are desiderata in the Society's Museum; which contains only bad specimens of some of the others, as 22 and 23. The *Cincl. Nipalense*, Hodgson, as before*noticed, has since been referred by that naturalist* to his genus *Alcopus* (v. *Actinodura*, Gould); and now ranks as the type of his genus *Ixops*.

Leiocincla, Nobis. *n. g.* Intermediate to *Garrulax*, *Ixops*, and *Leiothrix*, the very elegant bird upon which I found this generic designation has the bill shorter than the head, moderately compressed, somewhat wide at base, the outline of both mandibles accurved, and the tip of the upper bent over that of the lower mandible, rendering the slight arcuation of the former more apparent: nostrils basal, their aperture a narrow slit at the inferior margin of the nasal membrane: gape furnish with a few long but feeble bristles. Tarse of mean length, or rather short than otherwise: the toes formed for perching, and claws of moderate size. Wings having the first primary half the length of the third, and the fifth, sixth, and seventh, equal and longest. Tail long and graduated. The plumage very copious, dense and of silky texture, especially on the crown and occiput, where the feathers are much lengthened.

L. plumosa, Nobis. Entire length about nine inches, of which the tail measures five, its outermost feathers two inches less; wings three inches and three-eighths; bill to forehead, through the reflected frontal plumes, three-quarters of an inch, and seven-eighths of an inch to gape; tarse an inch. General colour different shades of soft brown, passing into rufous and delicate cinerous-lake; the latter prevails on the lengthened feathers of the crown and nape, and upon the

The *Turdus canorus*, Lin., is referred to *Ianthocincla* by Mr. Strickland, in a list of Chinese birds published in the 'Annals and Magazine of Natural History' for September 1843. This is the *Baniahbou de Bengale* of Buffon, who appears, however, to mix up two different species under this name, from Bengal and China respectively. I do not recognise the Bengal bird described by him, but may remark that the native name he cites is commonly applied to the Black-headed Oriole.

* *Crat. Swainsonii*, A. Smith, may be one, the figure of which I have not seen; but *Cr. Jardini* of the same naturalist would seem to be a *Malacocircus*.

ear-coverts; forehead deep reddish-brown, and throat tinged with the same: back and rump a rich and less rufous brown than the forehead, the rufous much increasing in intensity on the medial part of the wings, especially on the basal portion of the primaries and on the coverts of the secondaries; the coverts of the primaries and inner webs of the winglet-feathers are black; primaries having their inner webs dusky, and the narrow outer webs of the three first albescent-grey without markings; the terminal half and successively more of the other primaries being beautifully barred with black on a pale rufescent-ashy ground, and the secondaries and tertiaries with narrower black bars on a more rufous ground, this colour however again weakening on the exposed tertiaries: tail somewhat dark ruddy-brown, all but its middle pair of feathers banded with weak dusky, and passing into the latter towards the tips, which are white, successively decreasing in quantity to the middle pair; underneath, the transverse bars are only seen towards the tips of the tail-feathers, becoming there very distinct, and ending in dusky-black, which contrasts with the white extreme tips. Under-parts much paler than the back, but softly tinted, and tinged with the predominating rufous hue. Bill light horny; and legs pale brown. The colours of this species recall to mind those of the Wax-wings (*Bombycilla*), and are equally delicate. In the barred markings of its wings, the character of the crest, and other details of plumage, it manifests considerable affinity for *Ixops Nipalensis*; the feathers of which are however much less delicate and silky. Inhabits the vicinity of Darjeeling.

P. 181. My genus *Cinclidium* proves to be less allied to *Pellornium* than I had anticipated; and I now supply a figure of the species (*C. frontale*, Nobis), upon which it is founded. The bird is reported to be a fine songster, heard chiefly in the evening.

P. 183. *Pteruthius rufiventer*, Nobis. I described this species from a female example, and have now the pleasure of adding a notice of the plumage of the male. Length eight inches, of wing from bend three inches and five-eighths, and of tail three inches and a half, its outermost feathers an inch and a quarter shorter. Back and upper tail-coverts wholly deep ferruginous, as also the tips of the secondaries, of the longest tertiary, and of all the tail-feathers: head and nape, lores, ear-coverts, and infra-orbital region, deep black, glossed along the

edges of each feather ; throat, fore-neck, and breast, pure ashy ; and the rest of the under-parts, from the breast, a pale brownish-carneous, with a patch of golden-yellow on each side of the breast, bordering the grey : wings and tail wholly shining black, except the ferruginous tips before mentioned. The sexual diversity is accordingly considerable, the female having the upper-parts, wings, and middle tail-feathers, green, and only the upper tail-coverts ferruginous, together with the tips of the tail-feathers ; and the sides of the head grey, which margins also the feathers of the crown. Some nestling feathers intermingled on the crown of one female specimen, show that that part is also green, having slight black edges, in the young bird.

P. 184. Indian *Leiotrichanæ*. A Monograph of this group, by Mr. Hodgson, with additions and annotations by myself, is now awaiting publication.

Same page. *Parus flavocristatus*, la Fresnaye, *Mag. de Zool.* Janvier, 1837, apud Horsfield ; *Ibid*, 1838, apud Lesson, *Revue Zoologique par la Société Cuvierienne*, 1839, p. 42 : *P. sultaneus*, Hodgson, *Ind. Rev.*, April, 1837, p. 81. This, and the *Melanochlora Sumatrana*, Lesson, *Rev. Zool. &c.*, *loc. cit.*, appear now to me to be identical, my description of the latter in XI, 792, referring to the young. I have now before me four specimens from Nepál and four from Singapore ; and there is no difference in the length of the wings and tail, in the size of the bill, nor in any other respect that I can perceive, further than that the mode of preparing the Singapore specimens makes them appear considerably smaller.

Same page. Mr. Hodgson has rightly instituted a genus *Alcurus* for the species which I described by the name *Tricophorus striatus*.

P. 186. *Chloropsis Hardwickii* is referred to *Chl. curvirostris*, Swainson, by M. de la Fresnaye, apud M. Adolphe Delessert, *Souvenirs, &c.*, pt. II, 23, where a figure is given of it : *Chl. auriventris*, *Mag. de Zool.*, Guérin, 1840, p. 17, may be added to the synonyms collated in *loc. cit.*

There are five species of this genus now in the Society's Museum, one of which appears to have been confounded with *Chl. aurifrons* ; a sixth also inhabits India.

1. *Chl. curvirostris*, Swainson, or perhaps *Hardwickii* has still the priority. This species has always more or less orange-saffron colour

on the abdominal region, which in old males occupies the entire under-parts from the breast, with the exception of a little green on the flanks posteriorly; these have also the tail and greater portion of the wing dark purple, the tertiaries and adjoining coverts only remaining green, and the flexure of the wing verdigris-blue: throat and fore-neck black, passing into dark glossy purple on the breast: a large brilliant smalt-blue streak from each corner of the lower mandible; and the head and neck tinged with yellow. In younger males, the purple of the wings commences on the smallest coverts, and there is sometimes an admixture of this hue upon the tail. Females have less orange-saffron on the abdominal region, which is more or less patched with this colour, and the throat and breast are green, with the moustache-streaks less vivid than in the male. Nepâl, Bootan, Assam.

2. *Chl. aurifrons*; figured as *Chl. Malabaricus* in Messrs. Jardine and Selby's 'Illustrations of Ornithology,' as subsequently corrected by them in their Monograph of the genus. Has the crown brilliant orange, or saffron-red, the feathers rigid and glistening; throat wholly glistening smalt-blue; fore-neck black, surrounded by a yellow zone; wing-flexure verdigris-blue; and the rest green. Two specimens marked as female by Capt. Tickell differ in no respect from the male, excepting in being rather smaller, with the blue and glistening portion of the throat-feathers less developed. The young of both sexes have the forehead merely yellowish; the fore-neck bluish-green, surrounded by pale-yellow; the blue of the throat being confined, or nearly so, to a dull verdigris moustache; and not any of this colour at the base of the wing. Inhabits Bengal, Nepâl, Arracan, and Central India (neighbourhood of Chyebassa).

3. *Chl. cœsmarhynchos*,* Tickell, *J. A. S.* II, 579; *Chl. aurifrons*, apud Jerdon. Similar to the last species, but having no trace of blue on the centre of the throat, which is pure black, separating two well defined moustachial streaks of brilliant smalt-blue; and there is also no yellow zone surrounding the black of the fore-neck. Female with the black of the fore-neck less extended, and surrounded by pale straw-yellowish; the same moustachial streaks as in the male, but not

* This name would appear, however, to be merely a misprint for *gampsorhynchus* of Jardine and Selby.

so bright; and no brilliant orange-colour on the forehead: rest as in *Chl. aurifrons*. This is decidedly distinct from the preceding species; and if, instead of reading "throat, part of cheek, and forehead, black," we insert the word *of* before "forehead," Lt. Tickell's description perfectly applies to the present bird, which has the part in question similar to that of *Chl. aurifrons*: he appears to have confounded it, however, with the latter, which alone is frequently (and, so far as I have seen, exclusively) sold in cages at Calcutta; and the specimens here described are likewise from Central India, though Lt. Tickell has sent examples of the preceding species from Chyeabassa.* Peninsula of India.

In the three foregoing species, and I believe also in the next, the bill is slightly curved, slender, and tapers to a sharp point: whereas the two last have a very different form of bill, typified by that of *Chl. gampsorhynchus* (young male *Sonneratii*?), figured by Messrs. Jardine and Selby. The fifth is, however, somewhat intermediate.

4. *Chl. Cochinchinensis*; *Turdus C.*, Auct: *Melliphaga Javanica*, Horsf. "Male, with chin, throat, and gorge deep black, surrounded by a greenish yellow band, which extends through the eyes to the forehead; maxillary streak, hyacinth-blue. Female, with parts black in male of a light bluish-green, surrounded (as in male,) with yellowish band; maxillary streak light azure." Jerdon. Bill rather less elongated than in the last species. Inhabits the peninsula of India, and the Indo-Chinese and Malay countries.

5. *Chl. Malabaricus*. Considerably smaller than the others, the male having the wings and tail tinged with azure, in addition to the ordinary verdigris patch at the bend of the wing, which is unusually lustrous; head and neck wholly light yellowish, somewhat rufescent on the latter; throat and fore-neck black, surrounded by a pure light yellow zone, and a small short moustachial streak of brilliant smalt-blue. Female wholly green, except in having the blue moustachial streak, which is narrower than in the male; the throat but slightly flavescent; and there is no verdigris patch at the bend of the wing.† Young male similar to the female, except that the wings and

* I have recently received *Chl. cœsmarhynchos* from Midnapore, so that it may be presumed to be also occasionally brought alive to Calcutta.

† Mr. Eyton states that "the female differs from the male in having the markings less distinct." *P. Z. S.* 1839, p. 102.

tail are slightly (more or less) tinged with azure. Inhabits the Malay countries; and is doubtful, at present, as occurring in Malabar.

6. *Chl. Sonneratii*, J. and S.; *Phyllornis Mullerii*, Tem.; the female *Chl. zosterops* of the Monograph by Messrs. Jardine and Selby; and the young male apparently *Chl. gampsorhynchus* of the same. Adult male having the throat, loral region, and intermediate space, intense black, with a narrow moustachial streak of smalt-blue; the bend of the wing greenish-verdigris in some, others having little or no trace of this. Female having the throat and orbits yellow, and a slight blue moustache. Inhabits Southern India and the Malay countries. Of seven adult specimens before me, two or three have the bill closely approximating that represented of *Chl. gampsorhynchus*.

A seventh inhabits the Malay countries — *Chl. cyanopogon*; *Phyllornis cyanopogon*, Tem.: with a short bill, only the chin black, and a long cœrulean moustache-streak.

P. 187. The bird which I designated *Heterophasia cuculopsis* is identical with Mr. Hodgson's *Alcopus* (olim *Sibia*) *picoides*, J. A. S. VIII, 38; but as this genus appears to correspond exactly with *Actinodura*, Gould, P. Z. S. 1836, p. 17, I must (provisionally at least) consider them as identical, in which case the following species would be comprised in it.

1. *Act. Egertonii*, Gould, P. Z. S. 1836, p. 18. Nepâl.

2. *Act. gracilis*; *Hypsipetes gracilis*, McClelland and Horsfield, P. Z. S. 1839, p. 159, which appears to me clearly referrible to this genus, from Dr. McClelland's drawing of it. Assam.

3. *Act. picoides*; *Sibia picoides*, Hodgson, J. A. S. VIII, 38; *Heterophasia cuculopsis*, Nobis, Id. XI, 187. Nepâl, Bootan.

4. *Act. nigriceps*; *S. nigriceps*, Hodgson, loc. cit. Nepâl, Bootan.

Same page. The *Accentor* to which I applied the name *Himalayanus* with a mark of doubt, may be now termed *A. variegatus*; as the following species of this genus also occur in the Himalaya.

A. Nipalensis, Hodgson. Allied to *A. alpinus*, as indeed are both the others, yet this most so, though intermediate in plumage to that species and *A. modularis*. Length about seven inches, of wing three inches and three-quarters, and tail two and three-quarters; bill to gape five-eighths of an inch, and tarse fifteen-sixteenths of an inch. Newly moulted adults have the upper-parts nearly as in *A. modularis*,

but the dark colour predominating, and the striation of the head and neck obsolete, or very nearly so, these parts, with the ear-coverts and breast, being of an almost uniform dark brownish-grey; throat white, spotted with dusky-black, which forms two cross-bars on each feather, their extreme tips being greyish; belly and flanks bright dark ferruginous, mingled with the hue of the breast along the middle of the former; under tail-coverts dusky, tinged with ferruginous, and laterally margined with white: the feathers of the back are greyish-brown, with broad dark centres, or they may be described as blackish, with brown lateral margins, tinged with ferruginous towards and upon the scapularies: wings dusky-black, the tertiaries broadly margined with ferruginous, the other large alars slightly so, and all having a spot of this colour at the extremity of their outer edge; wing-coverts having a white spot at the tip of their exterior webs; and the small feathers near the bend of the wing coloured like the head: tail brownish-black, tipped with brown, the terminal spot of the inner web of each feather successively more albescent to the outermost; upper tail-coverts long, and brown with a dark central streak: bill dusky, the lower mandible yellow except at tip; and legs reddish-brown. In worn plumage, the margins of all the feathers have more or less disappeared, and what remains of them is faded in hue; the conspicuous white spots on the wing-coverts, and ferruginous margins of the tertiaries, being completely abraded, the former leaving a semi-circular sinus, as if artificially cut away. In this state of plumage, Mr. Hodgson has sent a specimen as distinct in species. The young have the clothing plumage of the usual flimsy texture, the under-parts coloured like the back, with no ferruginous on the belly; the spots on the wing-coverts are larger and less purely white; and the ferruginous on the scapularies and wing-coverts, dingy. Appears to represent *A. alpinus* on the Kâchar region of Nepâl.

*A. strophiatu*s, Hodgson. Size of *A. modularis*, and readily distinguished by its bright ferruginous breast and streak over the eye. Length about five inches and a half, of wing two inches and a quarter to two and a half, and tail two inches and one-eighth to two and a quarter; bill to gape five-eighths of an inch, and tarse thirteen-sixteenths of an inch. Upper parts much as in *A. modularis*, but the colours brighter and more contrasted, and the crown and neck uniform

with the back; a broad eye-streak, the first portion of which is white to beyond the eye, surmounting a ferruginous streak continued backward to the occiput; a semi-circle of the same surrounds the dusky ear-coverts, and the entire breast is also ferruginous; throat white, with dusky spots, forming a line descending from each angle of the lower mandible; belly and lower tail-coverts white with dusky streaks; wing-feathers dusky, margined with ferruginous, with an albescent spot at the tip of each covert; tail brownish, with dull rufous outer margins: bill black, and legs reddish-brown. Nepâl.

A. variegatus, Nobis, should follow *A. Nipalensis* in the series commencing with *A. alpinus*; and *A. strophiatatus* should, if I remember *A. montinellus* rightly, be placed next to that species.

P. 188. *Pitta nuchalis*, Nobis, is identical with *Hydrornis* (olim *Paludicola*) *Nipalensis*, Hodgson, *J. A. S.* VI, 103: but it is barely separable from the great group of *Pitta*, a monograph of which would be acceptable at the present time. The following is a slight contribution towards its effectuation.

In India, there appears to be only one species generally distributed, viz. *Pitta brachyura*, Auct., figured in Gould's Century. I kept a bird of this species for some time alive, but can remark little more than that it progressed by hopping, and that it is a remarkably silent species; though I am told that it frequently utters a screeching note in the wild state. Allied to it is a beautiful species common in the Malay countries, for which I have been unable to find a name, but can scarcely suppose it undescribed; viz.

P. Malaccensis? Nobis. Nearly similar to *P. brachyura*, but considerably larger, and everywhere much brighter-coloured; the wings much more largely marked with brilliant smalt-blue instead of verdigris-blue; the back a purer dark green; under-parts brighter fulvous; and belly and lower tail-coverts vermillion; under surface of wings black, without the white spot at the bend observable in *P. brachyura*, but the white patch on the quills much more largely developed, three of the secondaries being wholly of this colour.*

P. nigricollis, Nobis. Resembles the *P. strepitans*, Tem., of Australia,

* Found also, together with *P. gigas*, in Arracan, from which locality one of several specimens before me is remarkable for the unusual size of its bill, which measures an inch and a quarter to forehead and an inch and a half to gape.

except that the under-parts are bright sea-green, and that there is generally no trace of black on the centre of the crown. Length above seven inches, the wing four inches and a quarter to four and a half; bill to gape an inch and one-eighth. Crown dark rufous-brown, with occasionally some black on its centre; throat, sides of the head, and neck all round, black; bend of the wing and upper tail-coverts bright verdigris-blue; vent and under tail-coverts vermillion; a large white patch on the primaries; the back a fine glossy dark green, and under-parts lighter and more bluish green. Inhabits Assam, and the Malay peninsula.

P. rodogaster, Hodgson. I can only describe this from a wretched bad specimen. Nearly allied to the last, and upper-parts much the same, but less bright; the second range of wing-coverts largely tipped with white: a white transverse band also on the throat, and lower-parts dull brown, mingled with green, though I can detect no appearance of moulting. Perhaps only the young of the preceding species. Nepál.

P. gigas, Temminck. The Society possesses a Himalayan example of what appears to be the young of this species. Length about eight inches and a half, of wing four inches and three-eighths, and bill to gape an inch and three-sixteenths. Crown and lower ear-coverts dull brown, the former black-centred; lores, upper ear-coverts and beyond them, and another streak below the ear-coverts, black, occupying only the tips of the feathers on the latter; throat brown: rest of the upper-parts uniform bright dark blue; bases of the primaries white underneath, and under wing-coverts towards the axillaries the same: breast and belly light blue, with a slight shade of green on the former and of lilach on the latter, and all marked with imperfect black bands on each feather, becoming entire on the sides of the breast and flanks.*

P. coccinea, Eyton, *P. Z. S.* 1839, p. 104. A gorgeous species, scarcely yielding the palm of beauty to the lovely *P. cyenura*: wings short, rounded as in that bird, and more bowed or hollowed. Forehead and over the eyes black; the crown, occiput, and nape, intense carmine; rest of the upper-parts fine dark glistening purple, with a

* A specimen from Arracan is perhaps a female: the tail and its coverts are nearly as bright blue as in the Himalayan specimen, and there is an admixture of this colour on the interscapularies; but the rest of the upper-parts, from the red occiput, are dull greenish; and the blue of the under-parts is also weaker.



splendid shine; a longitudinal band on the wing approaching to smalt-blue; throat rufescent-brown; the fore-neck and breast purplish with red tips to the feathers, forming spots on the breast; belly, flanks, and lower tail-coverts, deep red: bill dusky-horn; and legs appear to have been plumbeous. Length seven inches or more, of wing three inches and a half, and tail an inch and a half; bill to gape an inch and one-eighth, and tarse an inch and five-eighths. Malay peninsula.

P. 190. The *Dimorpha albogularis*, Nobis, should not have been referred to that genus of Mr. Hodgson, and is identical with *Muscicapa superciliaris*, Jerdon, *Madr. Jl.* XI, 16. With my *D. superciliaris** preceding it, and which must now receive another specific appellation (*rubecula* would suit), it might form a particular sub-genus of *Muscicapidæ*. [This I have since termed *Muscicapula*, as introduced between brackets at p. 939 *ante*, where four species are referred to it, all of which inhabit the vicinity of Darjeeling.]

Same page. Indian Redstarts. To the various species of oriental Redstarts enumerated, may be added

Phenicura leucoptera, Nobis. Size of *Ph. ruticilla*, and much resembling in plumage *Ph. Reevesii*, but smaller and the wings much shorter than in the latter species; it is also generally similar to *Ph. ruticilla*, but has no white on the forehead, which, with the crown, neck, and fore-part of the back, are ash-grey; the middle of the back is black, as are also the lores, ear-coverts, throat and breast; and the rest of the under-parts, with the rump and tail except the medial feathers of the latter, are bright ferruginous, the exterior web of the outermost tail-feather being marked with dusky; wings dusky, having a large white patch occupying the base of the secondaries and tertiaries; bill and feet black: according to season, the dorsal plumage is margined with brown edgings, the under-parts more slightly with greyish, and the wing-coverts with brown. The female I have not seen. Length about six inches, of wing two inches and three-quarters, and tail two inches and three-eighths; bill to gape five-eighths of an inch, and tarse three-quarters of an inch. Inhabits the Malay peninsula.

* This, however, has been just received from Mr. Hodgson, who refers it to his *Dimorpha*, and he had previously sent a third species of the group. *Muscicapa superciliosa*, Gmelin, must not be confounded with either of these.

Ph. Reevesii, Gray. A description of this species may not be unacceptable. It much resembles *Ph. rutililla* except in its larger size, in having a conspicuous white wing-patch, and less white upon the forehead. Length six inches and a half, of wing three inches and a quarter to three and three-eighths, and tail two inches and seven-eighths; bill to gape eleven-sixteenths of an inch, and tarse seven-eighths of an inch. The white wing-patch is confined to the exterior margin of the basal half of the secondaries, whereas in the preceding species it extends over both webs of each feather. The female is nearly similar to that of *Ph. atrata*, but may be distinguished by its more puffy general appearance, the greyer and non-rufescent hue of its under-parts, and especially by the different relative length of the primaries, having the first short one more developed and the second less so, the difference between these being only an inch, whereas in *Ph. atrata* it is an inch and a half or nearly so. Inhabits Nepal and Assam.

P. 191. *Phylloscopus* (Boiè) *reguloides*; *Phyllopneuste reguloides*, Nobis, *passim*. This well marked species is not uncommon in the vicinity of Calcutta during the cool season.* A male measured four inches and seven-eighths in length, by seven inches and a quarter across, wing two inches and a half, and tail an inch and seven-eighths; a female gave respectively four inches and a half, six inches and seven-eighths, two and three-sixteenths, and an inch and three-quarters: but the generality are intermediate. Upper mandible dusky, the lower yellow; and legs yellowish-brown tinged with plumbeous. The mesial streak along the crown is broader and more conspicuous than in the next species, particularly on the occiput where it widens and contrasts with dusky on each side. It is readily distinguished from the next by its greater size, brighter colour, the absence of any whitish border to the tertiaries, and by most of the tail-feathers having their inner web margined with white; also by the plumbeous tinge of its legs. The young, as in *Ph. trochilus* and *Ph. rufus*, have their under-parts much brighter yellow than in the adults, during their first winter, and assume the mature dress early in the new year.

Ph. modestus; *Regulus modestus*, Gould: *R. inornatus*, Nobis, *passim*. This species, also, one of the European *Aves rarissimæ*, figured by

* Perhaps it also breeds here, like the next; at least occasionally, as I obtained one so late as March 15th.

Mr. Gould from the only specimen then known, which was procured in Dalmatia, and of which a second individual has since been met with in England (vide *An. Nat. Hist.* II, 310), is by no means rare in the neighbourhood of Calcutta during the cool season and for some time afterwards. The mesial streak along the crown is not always well defined, and it often requires some trouble to make this appear distinctly in the preserved skins. Scarcely any trace of it exists in the old stuffed specimen which I styled *Regulus inornatus*; mistaking the species, as Mr. Gould had previously done, for a member of that genus: but I have since examined numerous fresh specimens, and do not in the least now hesitate in assigning it to *Phylloscopus* of Boiè, or the restricted *Sylvia* of various modern British Ornithologists. The average size of a male is four inches long, by six to six and a quarter across, wing two inches, and tail an inch and a half. Upper mandible dusky, the lower yellow except at tip; and legs rather pale brown, without any plumbeous tinge: irides dark. In the published admeasurements of the British-killed specimen, the length of the tail is given as but an inch and one-sixteenth, which is the only dimensional discrepancy noticeable from the specimens before me; but it is probable that this is a misprint for an inch and seven-sixteenths, the more especially as the wings are stated to reach within three-quarters of an inch of the end of the tail, which is the case with those obtained here. From the described brightness of the yellow parts, I am inclined to think that the specimen killed in Northumberland was a bird of the year (shot in September), whereas mine are all adults, having comparatively dull plumage (as in various other species of *Phylloscopus*, *Ph. sibilatrix* constituting an exception). The crown and upper-parts have, in the worn plumage, but a slight greenish cast, which increases on the scapularies, and particularly on the lower part of the back and rump, which are tolerably bright greenish; superciliary streak whitish, but very slightly tinged with yellow, and chiefly so anterior to the eye; adjoining this is an inferior dusky streak posterior to the eye, and on a level with that organ; mesial line of the crown generally faint, and often scarcely discernible: the markings on the wings are nearly those of a *Regulus*, presenting two whitish cross bars slightly tinged in general with greenish-yellow, the posterior broader and formed by the tips of the greater coverts,

and the anterior by those of the lesser coverts; the tertiaries also are edged externally with whitish, and the primaries and secondaries more slightly bordered with the same, or, in some specimens, with olive-green; towards the posterior pale cross-band of the wing, however, is generally (not always) a well defined dark patch, caused by the secondaries being there unbordered, and which represents the blackish patch on the wing of *Regulus auricapillus*: the tail-feathers are not internally edged with white as in the preceding species; and the under-parts are dingy greyish-white, a little tinged with lemon-yellow, this colour appearing more conspicuously about the ear-coverts. The affinity which this species bears to the last will help to indicate its true systematic station, being strictly, as I may repeat, a *Phylloscopus*, and not a *Regulus*. Its habits, too, are solitary, and not gregarious as in the latter genus: and its song-note may be described as nearly similar to that of *Ph. sibilatrix*, but considerably weaker.*

Six other species of this genus occur in the vicinity of Calcutta. One I have already described as *Ph. fuscatus*, (*J. A. S.* XI, 113), and of this I have not hitherto obtained a second specimen.† It is at once distinguished by its comparatively large size, and prevalent brown colour. Three others of which I have also obtained ~~as~~ yet but one example of each, may be described as

Ph. nitidus, Nobis. Resembles *Ph. sibilatrix*, but is smaller in all its proportions, and has the entire under-parts, with the lower tail-coverts, tinged with yellow. Bill carneous-dusky, the lower mandible pale; and feet light brownish, tinged with yellow on the toes. This

* March 7th. A nest of this species has been brought to me, with the pair of birds attached to it. It is an elegant structure, pendent from a twig of guava, and was placed at a considerable height from the ground: being of a domed form, with two apertures, one in front above the middle, having a distinct overhanging canopy, the other on one side behind, placed rather higher up; the upper-part is attached throughout its breadth to the twig. The body of the nest is constructed of a fine and soft vegetable fibre, like fine tow, closely interlaced to the thickness of half an inch; and this forms the internal lining: the domed part is much less substantial, though sufficiently strong behind, where the lower part is supported. Outside are affixed a number of bits of bark, spider-cocoons, and a variety of other substances, recalling to mind the external lining of the nest of the European Bottletit (*Mecistura caudata*); which latter nest is fully double the size, but its single orifice is scarcely so large. There were no eggs in this nest, the outer lining of which is not completely finished. Both birds have their plumage very much worn, especially the male, the mesial coronal streak of which is only slightly indicated in part.—*E. B.*

† I have recently procured others, both of this and of *Ph. tristis*.

bird is of a much livelier green than any of the others, equally so with the European *Ph. sibilatrix*, and it is perhaps the species referred to *sibilatrix* in Royle's list: its under-parts are unsullied pale yellowish, brightest about the breast; and there is a pale bar crossing the wing, formed by the tips of the larger coverts of the secondaries. Length of a male four inches and three-quarters, by seven inches and a half across; wing two inches and five-eighths; tail two inches; bill to gape five-eighths of an inch; and tarse three-quarters of an inch.

Ph. magnirostris, Nobis. Allied to *Ph. trochilus*, but distinguished by its larger size, its considerably larger bill, and more developed rictorial vibrissæ; also by the less brownish cast of its upper-parts, in lieu whereof is a slight wash of fuscous, by the cinerascient tinge of those below, and the darkish cinerascient hue of the crown, which contrasts with the more greenish colouring of the back: the wings, too, have the small first primary more developed, and the second less so, measuring an inch from the tip of one to that of the other, whereas in *Ph. trochilus* this measurement is an inch and a quarter. Length five inches and three-eighths, by eight inches across; of wing two inches and three-quarters; and tail two inches and one-eighth: bill to frontal feathers seven-sixteenths of an inch, and five-eighths of an inch to gape: tarse three-quarters of an inch. Bill dusky above, fleshy horn-colour at base of lower mandible; legs light plumbeous, having a yellowish tinge. The entire upper-parts are uniform dark olive-green, the medial larger coverts of the wings being tipped with albescent-greenish; there is a narrow but strongly marked pale yellowish streak over the eye, and the lower ear-coverts are partly of the same hue; throat and breast tinged with grey, mingled with faint yellowish, the rest of the under-parts paler and whitish on the middle of the belly. The colour of the legs will help to distinguish it from *Ph. trochilus*. The shikaree who shot it informed me that it sung prettily, and on my imitating the well remembered note of *Ph. trochilus*, he assured me that the song of this bird was quite different.

Ph. tristis, Nobis. Closely allied to *Ph. rufus*, but devoid of any greenish or yellowish tinge on the plumage, except on the fore-part of the wing underneath, and faintly margining the quills and tail externally; legs and claws black, or rather dull black (much darker

than in *Ph. rufus*), except the under-surface of the toes which is yellow; bill also blackish, tinged with yellow at base of lower mandible, and the gape also yellow. Length four inches and a half, by six inches and a half across; of wing two inches and one-eighth; tail an inch and three-quarters; bill to gape half an inch; and tarse seven-sixteenths of an inch. General colour greyish-brown, beneath paler and albescent, a faint rufous tinge on the breast, and no trace of yellowish on the lower tail-coverts, nor elsewhere than as described.*

Ph. viridanus, Nobis; *Phyllopneuste rufa*, apud nos, XI, 191.† Allied to *Ph. rufus*, but of a weaker and much less brownish green above, and the under-parts much more albescent; the tarse shorter, but the length of wings and relative length of primaries the same: the colour of the tarse is also different, being of a greenish-leadene hue by no means dark. Length four inches and five-eighths to four and three-quarters, by seven inches and a quarter across; of wing two inches and three-eighths, and tail an inch and seven-eighths to two inches: bill above three-eighths of an inch from forehead, and nearly five-eighths from gape; tarse eleven-sixteenths of an inch.‡ Irides dusky. Bill dusky horn-colour above, the under mandible yellowish except towards the tip. Colour of the upper-parts a light dull olive-green, having a greenish cast when compared with those of *Ph. rufus*; of the under-parts greenish-albescent; and a narrow pale greenish streak over the eye: wings and tail light dusky, with greenish margins to the tertiaries and tail-feathers, and a slight whitish bar on the wing formed by the tips of the larger coverts. The note of this bird is weak, and is expressible by the sound *tiss-yip*, frequently uttered, but never repeated a number of times in continuous succession like the much louder *tsih-tseh* of the

* There is the faintest possible greenish tinge on the upper-parts of some that I have since procured, which colour is most developed on the margins of the secondaries, towards their base.

† *Ph. affinis*, of a catalogue of birds obtained in the vicinity of Calcutta, published in the 'Annals and Magazine of Natural History' for August and September, 1843.

‡ This species varies considerably in size. Of two recent examples before me, one measures five inches and one-eighth by seven and a half; wing two inches and a half; tail two inches; and tarse three-quarters of an inch: while the other is only four inches and a half by six and five-eighths; wing two inches and a quarter; tail an inch and three-quarters; and tarse eleven-sixteenths of an inch. I observe also that *Ph. modestus* varies a great deal in size. An unusually large one just obtained measures four inches and a half by seven inches across; wing two inches and a quarter, tail an inch and three-quarters; and tarse eleven-sixteenths of an inch.

European species. It is very numerous in the vicinity of Calcutta during the hyemal months, and is likewise common in Nepál.

Ph. lugubris, Nobis. Closely allied to the last, but averaging a rather larger size, with tarsi measuring fully three-quarters of an inch, instead of barely eleven-sixteenths of an inch, and they are likewise slightly darker than in the other. The whole upper-parts are also of a darker shade, particularly the head which is much darker and tinged with dusky; throat, breast, and flanks, dashed with ashy-grey, having traces of yellowish, and altogether this species is conspicuously of a darker and more fuscous shade than the preceding one. Its note again is different, and much louder than that of the last. Also common near Calcutta during the cold season; and a Madras specimen of the young has been forwarded by Mr. Jerdon. The young or rather second plumage of this species is much yellower than the adults, as in the corresponding garb of *Ph. trochilus* and *Ph. rufus*.*

Culicipeta, Nobis, *n. g.* General structure of *Phylloscopus*, but having a narrow Flycatcher's bill and armature of rictus, the ridge of the upper mandible angulated, and the breadth of the bill evenly attenuating.

C. Burkii; *Sylvia Burkii*, Burton, *P. Z. S.* 1835, p. 153; *Muscicapula bilineata*, Lesson, *Rev. Zool. par la Soc. Cuv.* 1839, p. 104. Length four inches and seven-eighths, by six inches and a half in alar expanse;

* Having lately received British specimens of *Ph. trochilus* and *Ph. rufus*, I have rewritten some of the above descriptions; and a long while subsequently to my first describing most of the species noticed in the present report, a packet of skins of this genus was received from Mr. Hodgson, amongst which I think I correctly recognised the *Ph. trochilus* and *Ph. rufus*, but *Ph. sibilatrix* was not among them, which species, together with the two preceding British kinds, are mentioned in the catalogue of Dr. Royle's birds procured at Saharanpore and its vicinity. Mr. Hodgson sent seven species of *Phylloscopus*, including the *modestus*, to which are to be added my *reguloides*, *nitidus*, *magnirostris*, *lugubris*, *tristis*, and *fuscatus*; making thirteen Indian species, and Dr. Royle's *sibilatrix*, if different from my *nitidus*, should constitute a fourteenth. Mr. H. also sent the European *Phyllopneuste hippolais* (*Sylvia hippolais* of Temminck, or a closely allied species), and the *Culicipeta Burkii* above described. Four of these species of *Phylloscopus* have the central coronal mark, and the specimen of *modestus* sent was in new plumage, with a more strongly marked mesial coronal streak than usual, thus resembling the figure in Gould's 'Birds of Europe.' All were temporarily returned, so that I have not them now by me for reference.

In a paper since forwarded by Mr. Hodgson, the species with central coronal streak are separated from the others; but I much prefer to arrange them as slight divisions merely of the same genus.

of closed wing two inches and a quarter, and tail an inch and three-quarters; bill to frontal feathers three-eighths of an inch; and tarse eleven-sixteenths of an inch. General colour bright yellowish olive-green above, and a full siskin-yellow underneath; over each eye a broad black streak reaching to the occiput, leaving the middle of the head greenish, more or less flanked with ashy-grey; tail dusky, its middle feathers flanked with the hue of the back, and the inner web of the outermost tail-feather white nearly throughout, as also the terminal half of that of the next: some have a dull yellow cross-band on the wing, formed by the tips of the coverts of the secondaries, which in others is obsolete. Irides dark. Bill dusky above; underneath, with the legs, pale brownish yellow, more or less bright, and darker on toes. This pretty little bird is not uncommon in the neighbourhood of Calcutta during the cold season.

Same page. Genus *Cinnyris* [or rather *Nectarinia*, which Mr. G. R. Gray, and since Sir W. Jardine, have shewn to be the prior appellation. The volume on Sun-birds in the 'Naturalist's Library,' by the latter gentleman, has just reached me, and a perusal of it has led me to rewrite the remarks I had to offer on this group*]. Of the elegant section with graduated tails, whereof the two middle feathers are prolonged considerably beyond the rest, the following Indian species occur.

1. *N. Goalpariensis*, Jardine; *Goalpara Creeper*, Latham, *Gen. Hist.* IV, p. 221, pl. XXIV; *Certhia Goalpariensis*, Royle, *Ill. Him. Bot. &c.*: *Cinnyris Vigorsii*, Sykes, *P. Z. S.* 1832, p. 99: *N. Seheriæ* (?), Tickell, *J. A. S.* II, 577: *C. miles*, Hodgson, *Ind. Rev.* 1837, p. 273: erroneously, it would appear, assigned by me on former occasions to *N. mysticalis*, Tem., vide XI, 107. A gorgeous little bird, having the throat, fore-neck and breast, intensely brilliant carmine, with a glossy violet stripe on each side, from the corner of the lower mandible to more than half-way down the neck: ear-coverts, sides and hind-part of the neck, back, scapularies, and smaller wing-coverts, a darker sanguineous: forehead and crown of the head, together with the upper tail-coverts, dark shining metallic green, more or less glossed with purple: rump bright yellow: middle tail-feathers externally purple towards the base and at the tip, the rest shining bottle-

* In a letter just received from the author, *N. calcostetha* of his synopsis of the *Nectarinidæ* is identified with *N. insignis*.

green; margins of the other tail-feathers similar, to a greater or less extent: the rest of the wings, with the occiput, dull brownish green; and below the breast, the same but lighter: bill horn-colour at base, the terminal half of the upper mandible, and nearly all the lower, paler; legs brown. "The female and young," observes Mr. Hodgson, "wear a sombre russet robe instead of the flaming scarlet of the male; their cap is not burnished, nor have they the splendid moustache; and the central rectrices are neither pointed nor prolonged beyond the series of the rest.* Length of the male six inches, by six and a half in extent, and a quarter oz. in weight." Wing from bend two inches and three-eighths, and middle tail-feathers three inches: bill from forehead three-quarters of an inch, in a straight line; and tarse half an inch.

This splendid bird appears to be common in the Tenasserim provinces, and also in Nepal, being much rarer, or perhaps local, in central and southern India. Col. Sykes, in his catalogue of the birds of the Deccan, remarks, that "it inhabits only the lofty trees of the dense woods of the ghats." Mr. Jerdon has not been successful in meeting with it; but Lieut. Tickell procured a single one "near Seheria in Borabhûm, flitting about the low willow-bushes in the dried bed of a stream. — It has no song, but a shrill chirp." The description given by that gentleman entirely accords with specimens before me, except that he assigns four inches as the length, which is probably a misprint for six inches. Dr. Royle figures it as one of several tropical birds that visit northern India and the Himalaya during the rains, though at least one of its companions in the same plate is strictly Sub-Himalayan: neither his coloured figure, however, nor that in the 'Naturalist's Library,' makes any approach to the brilliancy of nature.

1. a. *N. Lathamii*, Jardine, *Nat. Lib., Orn.*, Vol. XIV, 233-68.
"We possess a specimen of a Sun-bird from some part of Continental

* Evidently the *C. concolor* of Col. Sykes's catalogue, defined as "*C. viridiviridis, alis caudaque saturatioribus, corpore subtilius pallidiore. Longitudo corporis, 4 unc.; cauda 1. Irides intensè rufo-brunneæ:*" to which is added — "As four specimens obtained by Col. Sykes were all females, and as they were met with in the same locality as *C. Vigorsii*, *C. concolor* may be the female of that splendid species; but the difference in the size, form, and aspect of the bird, independently of colour, is opposed to this" (certainly not): "they were never seen together. This bird has the outline of *C. maharattensis*. The specific appellation *concolor* is given provisionally."—*P. Z. S.* 1832, p. 99.

India," writes Sir W. Jardine, "closely allied to *N. Goalpariensis*, and also to the *Certhia Siparaja* of Sir Stamford Raffles's catalogue. From the Goalpara Sun-bird it differs in a slight general modification of the tints of the plumage, in the yellow of the rump being much deeper, and in the coronal patch, upper tail-coverts, and tail, being steel-blue instead of metallic green, and in the tail being shorter and more regularly graduated. Sir Stamford's bird is from Sumatra; no mention is made of the yellow rump, while, in the catalogue appended to that gentleman's memoirs, *N. mysticalis*, Tem., from Java, is quoted. A comparison of the birds may serve to distinguish them. The entire length is four inches and two-fifths; that of the bill to the forehead three-fifths of an inch. [*N. Seheria*? Tickell.] Above the forehead to the line of the eyes is steel-blue, with a play of colour; the upper tail-coverts and edges of the tail-feathers, except the outer, are of the same tint, and the tail itself, which is nearly black, has a very strong gloss of bluish-purple; the back and sides of the neck, cheeks, back, and lesser wing-coverts, are rich brownish-red: the lower part of the back and rump are very deep gamboge-yellow, almost Dutch orange, and following the red of the back we have the same lengthened plumes we saw in the last, of a dark greyish oil-green, and which can completely cover the yellow patch; the wings are umbre-brown, feathers edged with a paler tint and oil-green. Underneath, we have the maxillary stripes running upon the sides of the neck, inside-half of the feathers black, the exterior rich violet, the chin, fore-part of the neck and breast, bright scarlet-red; the remaining under-parts dull greyish oil-green. Bill umbre-brown, slightly paler on the maxilla.

"As stated, we do not know the locality of the specimen we have described, and in the collection of the Zoological Society there is one similar, and bearing out the distinctions from *N. Goalpariensis* we have pointed out, but the locality of which is also unknown."

On comparison of this description with several specimens of *N. Goalpariensis*, I am constrained to doubt very much the distinctness of *N. Lathamii*, and would suggest that it is perhaps a female *Goalpariensis* in masculine attire. There is indeed generally a greater or less admixture of steel-blue, with the glossy bottle-green of the cap and sometimes the upper tail-coverts of the latter, and still more upon the tail itself, as noticed in my description.

2. *N. ignicauda* ; *Cinnyris ignicauda*, Hodgson, *Ind. Rev.* 1837, p. 273 : *C. rubricaudata*, Nobis, mentioned in *J. A. S.* XI, 192 : *N. phænicura*, Jardine, *Nat. Libr.* Mr. Hodgson thus describes this species, in its post-nuptial garb, certain species of Sun-birds being well known to assume a dull-coloured plumage after breeding. "Above, olive-green ; beneath, together with the rump, yellow : chin, cheeks, and front of the neck, blue-grey with a greenish wash ; breast dashed with fiery-red ; caudal plumes and their upper coverts intense igneous-red ; remiges and rectrices, internally, dusky-brown : seven inches long, whereof the tail is three inches and three-quarters, its two central plumes passing the rest by an inch and three-quarters : weight half an oz., or considerably larger than most of the others. The female is smaller, and has her caudal plumes of the same hue with the body above, and merely fringed with fiery-red ; but the coverts are igneous, and the breast is touched with fire, as in the male : the tail wants the prolonged plumes of the male, as in all the long-tailed species.

"*C. ignicauda* is distinguished, specifically, by the comparative straightness of its bill, which is, indeed, distinctly curved, but less so than in the allied species ; it scarcely reaches the average excess of the genus, or one-third more than the head."

A male and female have recently been sent by Mr. Hodgson, the medial tail-feathers of the former being no less than five inches in length. It otherwise agrees with the above description, except that the olive-green plumage of the upper-parts is not completely put forth, several brilliant red old feathers being intermixed with it. I have now no doubt of its identity with my *C. rubricaudata*, of which I took the following description from a Darjeeling specimen. Upper-parts as in *N. Gouldii*, except that the tail-coverts are scarlet, and the long middle tail-feathers crimson, the crown also being violet unmixed with lake-purple ; and under-plumage resembling that of *N. Nipalensis*, but having more reddish flame-colour, and less diffused, on the centre of the breast, while the throat and fore-neck have no greenish gloss, but are intensely rich dark shining purple along the middle, and brilliant violet laterally. No painting could express the splendour of this magnificent species. The back is of a burnished and richer crimson than that of *N. Goalpariensis*, or of *N. Gouldii*, from both of which this species differs in possessing none on the smaller coverts of the

wings, which, with the scapularies, are glossless green, as in *N. Nipalensis*; from the latter it differs, and resembles *N. Gouldii*, in the crimson of the back extending up the hind-neck to the occiput; there is a yellow band, as in most of the allied species, across the rump; the lores and ear-coverts are glossless black, mixed with green on the latter; and the greater wing-feathers, and their larger coverts, dusky, edged with greenish, passing into rufous on one of the secondaries on each side; the outer tail-feathers have their inner webs dusky, the outer red, and tips a little greenish: under-parts bright yellow, passing into greenish on the flanks, vent, and lower tail-coverts, and deeply tinged with gorgeous flame-colour on the centre of the breast. Bill black, and but very little curved; legs brown. Length six inches and one-eighth, of which the bill measures three-quarters of an inch to forehead, and middle tail-feathers three inches and one-eighth; the latter do not taper at the end: wing two inches and a quarter; and tarse nine-sixteenths of an inch. On the neck are two or three unmoulted feathers, which are greenish like the scapularies.

Mr. Hodgson's female is wholly olive-green, paler and yellowish beneath; upper tail-coverts and central pectoral spot igneous-red; and tail slightly tinged with the same, its form graduated, but the middle pair of feathers scarcely passing the next.

Sir W. Jardine's *N. phœnicura*, from Sylhet, would seem to be identical, except that the chin and centre of the throat and neck are described to be deep velvet-black, with two broad maxillary stripes steel-blue with violet reflections: unfortunately, I have not a specimen wherewith to compare his description.† What this naturalist, however, considers to be the female, is evidently the male in corresponding plumage to that described by Mr. Hodgson.‡ It would appear to be a rare species in Nepâl, and is also rare in the vicinity of Darjeeling.

3. *N. labecula*; *C. labecula*, McClelland and Horsfield. *P. Z. S.* 1839, p. 167. * *Punicea, gula, pectoreque nitidissimis, capite, plumis*

* These middle tail-feathers could not have been full grown: *vide* in following note.

† In a beautiful collection of Darjeeling specimens just arrived, from which I am kindly permitted to make a selection, there are three beautiful males of this species, which quite agree with my description, and are also evidently identical with Sir W. Jardine's *N. phœnicura*. In all of these the middle tail-feathers are growing.

‡ I perceive that this was subsequently remarked by Sir William in his Synopsis; or at least that he considered it to be a young male.

scapularibus, caudaque metallicè aureo-viridibus; alis fuscis viriditulentibus; subtus cana. Body three inches, tail two inches long:" from Assam. I have seen a drawing of this bird, which pertains to the present group, and is obviously distinct from all the others here described.

4. *N. Nipalensis*; *Cin. Nipalensis*, Hodgson, *Ind. Rev.* 1837, p. 273. Nearly allied to *N. Gouldii* figured in the 'Century of Himalayan Birds,' but larger, with the dark scale-like feathers of the crown continued down the back of the neck, and glossed with greenish, sometimes a little bronzed, instead of violet; the same remark applies to the tail and its coverts, and to the throat; and there is also no red on the smaller wing-coverts, while that of the back is darker and quite glossless: middle of the breast tinged with flame-colour, of which there is seldom more than a faint trace in *N. Gouldii*, and often not any, while *N. ignicauda* has much more of it. The present species is remarkable for the comparative length and looseness of the feathers of its hind-neck, which have broad scale-like tips that, together with the crown, occiput, throat, upper tail-coverts, long and tapering middle pair of tail-feathers, and the outer margins of the other tail-feathers, are brilliantly glossy dark steel-green; lores and ear-coverts black, the latter glossed with purple; scapularies and margins of the wing-feathers olive-green, as in *N. ignicauda*, which the breast and under-parts resemble except in having less flame-colour, which is more diffused; yellow of the rump brighter than in most of the others: bill black, and legs dusky-brown. Length five inches and three-quarters, of which the middle tail-feathers measure two inches and five-eighths, and the bill from forehead three-quarters of an inch; wing two inches and one-eighth; and tarse nearly five-eighths of an inch. The female is rather smaller, and uniform olive-green above, faintly tinged with rufous; below paler and yellower: tail shorter, with its middle pair of feathers scarcely elongated beyond the rest. "The young males," according to Mr. Hodgson, "are earthy-brown on all the glossed parts of the mature males. So also in [*N. Goalpariensis*], and (as I suspect,) in all the gorgeous species." Habitat Nepâl and Sikim: very abundant about Darjeeling.

5. *N. Gouldii*; *C. Gouldii*, Vigors, *P. Z. S.* 1837, p. 44; Gould's *Century*, pl. LVI. Rather smaller than any of the preceding, with

the sides and hind-part of the neck, the back, scapularies, and smaller wing-coverts, deep crimson, as in *N. Goalpariensis*; crown, ear-coverts, and throat, rich glossy violet, or purple, according to the light; a brilliant shoulder-tuft of the same; and the upper tail-coverts, lengthened middle pair of tail-feathers, and outer margins of the other tail-feathers towards their base, also similar; rest of the tail dusky, the three outermost feathers with albescent tips, as is likewise the case in *N. Nipalensis*, and with the next species; yellow band over the rump as usual; wings beyond the smaller coverts dusky, margined with olive-green; the breast and belly bright yellow, with sometimes a faint tinge of flame-colour about the middle; bill blackish, and legs dark brown. Length five inches and a half, of which the bill to forehead measures nine-sixteenths of an inch, and the long tail-feathers three inches; wing from bend two inches and one-eighth; and tarse half an inch. The only female I have seen was deficient in the tail, and was everywhere dull olive-green, paler on the under-parts, deeper and slightly aureous on the back, with a somewhat reddish cast on the margins of the primaries and secondaries. This beautiful species is rare at Darjeeling, where it is much sought after by collectors, who have currently styled it the "Beauty of the Hills," a name by which it will be recognised by many.

6. *N. Horsfieldi*; *Cin. Horsfieldi*, Nobis, mentioned in *J. A. S. XI*, 107. Upper-parts very similar to those of *N. Nipalensis*, only without the red, a slight trace of which, however, appears on the lower part of the sides of the neck; the scale-like nuchal feathers, also, are not so broadly glossed as in *N. Nipalensis*, and have more of a purplish shine; the under-parts, too, differ only in having merely the slightest trace of flame-colour, as in some specimens of *N. Gouldii*, and which as in that species may often be wanting altogether: the whole back, scapularies, and margins of the wing-feathers, are golden olive-green, and the yellow on the rump (as in *N. Nipalensis*) is very broad and conspicuous; the ear-coverts are glossed with purple, and the lores and sides of the neck are unglossed black: bill dusky, and legs brown. Length five inches and a half, the bill to forehead measuring three-quarters of an inch, and the long middle tail-feathers two inches and a half; wing from bend two inches and one-eighth; and tarse exceeding half an inch. Female unknown. The only specimen

observed was contained in a collection partly from the Himalaya and partly Malayan.*

7. *N. saturata*; *Cin. saturata*, Hodgson, *Ind. Rev.* 1837, p. 273: *C. Assamensis*, McClelland and Horsfield, *P. Z. S.* 1839, p. 167: *N. Hodgsonis*, Jardine, *Nat. Libr.* Size of *N. Gouldii*, but having a considerably larger bill, and predominating deep black plumage, which colour extends over the throat, breast, and fore-part of the belly, the lores, ear-coverts, and sides of the neck, and on the wings and rump, upon which last there appears to be more or less trace of the ordinary yellow band in different specimens, but never much; scapularies and interscapularies dark sanguineous; crown, occiput, and back of the neck, brilliant steel-blue approaching to violet, and a streak of the same down each side of the front of the neck, commencing at the corner of the lower mandible and gradually widening; upper tail-coverts, lengthened middle tail-feathers, and margin of the next pair of tail-feathers towards the base, glossy steel-blue, like the head; flanks, hind-part of the belly, and lower tail-coverts, dull olive-green; rest of the tail black, as is also the bill, and feet brown; the greater wing-feathers are margined with dark olive. Length six inches, of which the bill to forehead rather exceeds three-quarters of an inch, and the tapering middle tail-feathers measure three inches and a quarter; wing from bend an inch and one-eighth, and tarse posteriorly half an inch. Extent, according to Mr. Hodgson, seven inches, and weight a quarter of an ounce. This species inhabits Nepâl, the vicinity of Darjeeling, and Assam.

Upon the various allied long-tailed *Nectariniæ* inhabiting the Indian Archipelago, I have no information to contribute. Of those with even or but slightly rounded tails, there appear to be only two species in Bengal, which are pretty generally distributed throughout India proper.

N. Zeylonica; *Certhia Zeylonica*, Linnæus: *Cin. sola*, apud Jerdon, and of my former reports: *C. lepida* (?),* apud Sykes.† Very abundant in the neighbourhood of Calcutta throughout the year,

* The donor of that collection has just informed me that the specimen in question formed part of a consignment which he received from the hills, *i. e.* the Himalaya. Can it be a variety only of *N. Nipalensis*?

† *C. lepida* of Latham is evidently the *Anthreptes Javanica* of recent authors; while *C. lepida* of Sparrman is regarded in Griffith's work as the female of *N. sperata*.

the male retaining its bright colours at all seasons. The female is dull-green above, with a slight rufous tinge, and cinnamon-coloured edgings to the greater wing-feathers; tail dusky-black, and under-parts less bright yellow than in the male, having the throat and fore-neck albescent. The young, in nestling garb, resemble the female, but have the throat and flanks as yellow as the breast, a streak over the eye more distinct and yellow, and dark hazel irides. This appears also to be the commonest species of the genus in peninsular India, but I have never seen it in collections from the Himalaya, nor is it included among the Nepalese species by Mr. Hodgson. It has a weak shrill chant, delivered in the same key as the song of the British *Accentor modularis*; and frequently emits a low weak chirp, that recalls to mind the analogous note of a *Regulus*, or of *Certhia familiaris*. The natives here take them with bird-lime, and after plucking out the wing-primaries to prevent their fluttering, tie them to a stick, and carry rows of them thus about for sale. These may be kept alive for several days on merely sugar and water, and I have heard one sing that had had no other diet for some days; but raspberry or other fruit-jam is a better kind of food on which to keep these nectar-feeding birds. The members of the present genus, however, by no means confine themselves to a regimen of the kind, and I have taken so large a spider from the stomach of *C. Mahrattensis*, as to have wondered how it could have been swallowed. Mr. Hodgson, indeed, has even declared that he "entirely doubts their alleged nectarinean diet" (*Ind. Rev.* I, 273); but this is going rather too far, as the facts already stated tend sufficiently to shew.

According to Mr. Walter Elliot, the present species "builds a hanging nest with an entrance near the top, opening downwards"; and such is the form of a beautiful fabric before me, which I am assured is the production of this bird: it is attached, nearly throughout its length, to a small thorny twig, and is of an elongated pear-shape, composed chiefly of soft vegetable fibres very densely and neatly interwoven; on the outside are some coarser strips of grass-leaves, scalings of bark, &c., but the substance and internal lining are constructed of the softest fibres only, which are reflected over the lower portion of the entrance so as to fasten down its rim, imparting thus a neatness of finish to this part of the structure; above the floor of the entrance is an

overhanging roof or canopy, formed by the lining of the upper third or more of the nest being made to project semi-circularly over the orifice, and then finished externally like the rest with coarser material, and some bits of leaves and the like to disguise the nature of the fabric.

N. minima; *Cin. minima*, Sykes, *P. Z. S.*, 1832, p. 98. A diminutive species, allied to the last, from the upland forest-jungles of southern India. The Society is indebted for a specimen to Mr. Jerdon.

N. Mahrattensis; *Certhia Mahrattensis*, Latham: *Cin. orientalis*, Franklin: *C. epauletta*, Hodgson, *Ind. Rev.* I, 272: *C. currucaria*, apud Sykes, post-nuptial plumage. Visits the neighbourhood of Calcutta only in the cold season, when it is not uncommon. On its arrival, both sexes are clad in the plumage referred to *N. currucaria* by Sykes; and before they leave, all have more or less completely assumed their nuptial dress, which also is alike in both sexes. In Nepâl it is probably a summer visitant only; and it extends westward to the Indus, and southward to Ceylon, but I have never seen it from the eastern side of the Bay of Bengal.*

N. lotenia; *Certhia lotenia*, Lin.: *C. polita*, Latham, Jerdon: *C. purpurata*, Vieillot, Shaw. Allied to the last, but distinguished by its superior size, its much larger and more curved bill, and brown under-parts from the breast, also by the admixture of green in its glosses.

* I have lately procured the young of this species, which is dark olive-green above, and tolerably bright yellow on the under-parts; wings dusky, with brownish margins to the tertials; and tail black, its exterior feathers tipped with whitish, and the outermost pair largely so, extending far up their outer webs. To this plumage would succeed the purple breeding dress; and the *Cin. strigula*, Hodgson (*Ind. Rev.* 1837, p. 272), would seem to be founded on a specimen which had begun to throw out the purple feathers as "a long central stripe from chin to breast," just as is shewn by another specimen before me, which however is moulting into the purple garb from the non-breeding livery of the adult, this last being, I apprehend, Mr. Hodgson's female *strigula*. The following is that naturalist's description. "Above dark olive-green, below bright yellow, shoulders and a long central stripe from chin to breast, brilliant deep blue; alar and caudal plumes dusky or black, the latter tipped and margined laterally in the extremes, with white; a paler line over the eyes, and darker one through them: bill dusky; legs black. The female is earthy-brown above, and greenish-yellow below. She is without gular stripe or shoulder-spot. Size and characters of [*N. Mahrattensis*]."

Since writing the above, I have found a skin referred by Mr. Hodgson to the female of his *strigula*, but which has no trace of "greenish-yellow" on the under-parts, these being uniform dull albescent: so far as I can make out, from the condition of the specimen, I should judge it to be an old female *Mahrattensis* in the non-breeding plumage.

Alleged breeding plumage of the female as unlike that of the male as in *N. Zeylonica*, wherein it would differ remarkably from *N. Mahratensis*. Inhabits Southern India and Ceylon.

N. jugularis, Vieillot, apud Jardine; or a closely allied species, perhaps distinguishable upon actual comparison from the Philippine bird cited. Length about four inches and one-eighth, of wing two inches and one-sixteenth, and tail an inch and one-eighth; bill to forehead five-eighths of an inch, and tarse under half an inch. Colour of the upper-parts dull olive-green, brightening a little on the rump: beneath moderately bright king's-yellow; and the axillary tuft intense yellow with flame-colour anteriorly: throat and front of the neck very dark glossy purple, margined laterally and at the gorget with bright steel-purple, below which is a trace of a narrow cross-band of dark red. Bill and feet dusky. Female similar, except in wanting the axillary tuft, and having the throat and fore-neck yellow, like the rest of the lower-parts; but one of three specimens (probably an old female, rather than a male in *undress*,) has the middle of the throat and front of the neck dusky, flanked with yellow. All have the tail blackish, and its outermost feathers tipped with purer white than is usual in this genus, this successively decreasing in quantity on the two or three next. Common in the Tenasserim provinces.

Certain species with straighter and less prolonged bills constitute the division *Anthreptes*, Swainson. *Nect. Javanica*, Horsfield, is cited as an example, and it is from this species that the diagnosis is evidently drawn up; for in the Tenasserim and Malayan species formerly referred by me to *rectirostris*, Auct., but which would now appear to be different, the bill is still shorter and less curved, the upper mandible is at least as high as broad at base, where its upper ridge is continued sharp to the forehead. I will designate it

Anthr. phœnicotis.* Length four inches and a quarter, of which the bill to forehead measures half an inch, and the tail an inch and three-quarters; wing two inches and one-eighth; and tarse eleven-sixteenths of an inch. Upper parts a glossy bronzed green, including the crown and wing-coverts; upper tail-coverts glossy green without the bronzing; rest of the wings and tail dusky, the feathers of the latter

* I see that Temminck has already applied to it the identical specific name, terming it *Nectarinia phœnicotis*, p. c. 108, f. 1, and 338, f. 2, apud *Dict. Class.*

margined with shining green, and the secondaries and tertiaries slightly with faint purple: throat, fore-neck, and breast, a light ferruginous; the rest of the under-parts bright yellow: ear-coverts amethystine, passing into ruby-red on the sides of the neck, and separated from the hue of the throat by a stripe of glossy purple; bill dull black, and legs appear to have been greenish. The female has the upper-parts glossless olive-green with a tinge of grey; breast as in the male, but scarcely so bright; and under-parts dull greenish-yellow; alars and caudals margined with aureous-green. The young resemble the female, except in the more downy texture of their feathers, and the chestnut colour of the fore-neck and breast is reduced to a slight tinge. Inhabits the Tenasserim provinces, and appears to be common at Singapore.

In the same range of territory *Anthr. Javanica** abounds; and in the southern portion of it occurs a species which much approaches in its plumage the *Arachnotheræ*. I shall term it

Anthr. nuchalis; the female indicated, but not described, as *A. macularia*, *J. A. S.* XI, 107. Length about five inches and a half, of wing two inches and five-eighths, and tail an inch and seven-eighths; bill to frontal feathers above three-quarters of an inch, and but little curved; tarse five-eighths of an inch. General colour of the upper-parts a rich dark olive-green, the tail dusky, its outer feathers successively more broadly margined with whitish, chiefly on their inner webs; the base of the hind-neck, and the upper tail-coverts, (of the male only,) brilliant steel-blue: under-parts streaky, each feather broadly marked with dark olive-green along the middle, and laterally margined with pale sulphur-yellow, brightest on the belly: bill dusky horn-colour; and legs leaden-brown. Singapore.

The two species assigned to *Anthreptes* in Mr. Eyton's list of a collection from the Malay peninsula, published in *P. Z. S.* 1839, p. 105, would seem, from the length of bill, as well as from their size, to be rather referrible to *Arachnothera*. This group consists of Sun-birds of comparatively large size and sombre greenish colouring, with a very long and but moderately curved bill, and nostrils (apparently) closable at will by the impending membrane. They appear, like the last, to be peculiar to tropical Asia and its Archipelago, and are regarded by Mr. Hodgson as the most highly typical form of the family. Such are—

* *Certhia lepida* of Latham.

1. *A. magna*; *Cin. magna*, Hodgson, *Ind. Rev.* 1837, p. 272: *A. inornata* (?), Tem., apud Horsfield, *P. Z. S.* 1839, p. 167*. "Length eight inches by eleven and a quarter, and weight an inch and three-quarters": bill to forehead an inch and five-eighths; wing three inches and a half; tail two inches and one-eighth; and tarse above three-quarters of an inch. Upper-parts greenish-yellow, each feather having a central black streak; lower-parts yellowish-white, similarly striated: tail with a subterminal black band, and an adescent spot beyond this on the inner web of its outer feathers: "bill dusky; legs, feet, and claws, bright orange", the hind-toe very large and strong. Inhabits Nepai and Assam.

2. *A. (?) flavigaster*; *Anthreptes flavigaster*, Eyton, *P. Z. S.* 1839, p. 105. Size of last, and length of bill the same. "*Capite, dorso, pectore colloque cinereo-viridibus; corpore subtus flavo; alis, caudâ tectricibusque alarum, brunneis; rostri mandibulâ superiore atrâ, inferiore flavâ; pedibus brunneis.*" Inhabits the Malay peninsula, where termed *Chichap Rimba*.

3. *A. (?) modesta*; *Anthreptes modesta*, Eyton, *P. Z. S.* 1839, p. 105. Length six inches and a half, of which the bill measures an inch and a quarter; tarse five-eighths of an inch. "*Vertice, dorso, alis, caudâque viridi-olivaceis hæc singulis pennis mediis brunneis, illâ præpillatâ atro; corpore subtus viridi, singulis pennis in mediis obscuris; rostro pedibusque brunneis.*" Inhabits the Malay peninsula, where denominated *Chichap Nio*.

4. *A. chrysogenys*, Tem. *pl. col.* 388, fig. 1; *Certhia longirostra*, Raffles, *Lin. Trans.* XIII, 299, but not of Latham and others. Length about six inches and three-quarters, of which the bill measures an inch and three-eighths to forehead, and the tail two inches; wing two inches and three-eighths, and tarse eleven-sixteenths of an inch. Colour of the upper-parts dull olive-green, the alars and caudals margined with yellowish: under-parts lighter, slightly washed with yellow, and very faintly striated; belly and under tail-coverts moderately bright yellow; the tibial feathers brown: cheeks beneath the eye naked of feathers; a bright yellow tuft commencing at the gape, and orbital mark of the same above the eye: bill dusky, the edges of the upper mandible

* At least Dr. McClelland's drawing of what I have reason to suspect is the identical specimen referred to, represents the present species.

yellowish, as appear also to be the legs and toes. Inhabits the Malay countries.

5. *A. inornata*, Tem., *pl. col.* 84. ; *Cin. affinis*, Horsfield, *Lin. Trans.* XIII, 166 ; *C. longirostris*, Jerdon, *Supplement to Catalogue*. Length five inches and three-quarters, of which the bill to forehead measures sometimes an inch and a half, and tail about the same ; wing two inches and a half to two and five-eighths, and tarse five-eighths of an inch. Colour of the upper-parts olive-green more or less flavescent ; the crown darker, with scale-like feathers, merely green-edged : under-parts dull greenish-albescent, passing into brighter pale yellow on the belly : tail-feathers slightly tipped with whitish, chiefly on their inner-webs, forming a spot which is more distinct to the outermost. Bill dusky above, the lower mandible whitish underneath ; and legs plumbeous. Inhabits the Malay countries, spreading northward to Arracan ; and Mr. Jerdon has obtained one specimen of it in the Mysore district, bordering the Neilgherries.

6. *A. longirostra*, Tem. ; *Certhia longirostra*, Lath., *Ind. Orn.* 299 ; *Cin. longirostra*, Horsfield : figured in Griffith's Edition of the *Régne Animal*, VII, 392. " Ashen-olive above ; alar quills brown, edged with olive ; caudal blackish, white-tipped ; throat and front of neck white ; rest [of under-parts] clear yellow. Java."

7. *A. latirostris*, Nobis. Length six inches, or nearly so ; of wing two inches and seven-eighths ; and middle tail-feathers an inch and three-quarters, the outermost above three-eighths of an inch less : bill to forehead an inch and a quarter ; being shorter and much broader than in *A. inornata*, but tapering to its extremity, and also more curved : tarse five-eighths of an inch. Upper-parts bright yellowish olive-green, the lower pale ashy-green, and obscurely striated ; lower tail-coverts tipped with whitish : tail more graduated than usual in this group, with a subterminal dusky band, all but the medial two pairs of tail-feathers having a well-defined pure white spot near the extremity of the outer web, successively larger to the outermost. Bill dusky-brown above, the lower mandible pale ; and feet yellowish. Inhabits the vicinity of Singapore.

To conclude this notice of Indian *Nectarinidæ*, there remains to be considered the genus *Dicaeum*. Of this there are two Indian species remarkable for the absence of vivid colouring.



D. concolor, Jerdon, *Madr. Jl.* XI, 227. Length about four inches, of wing two inches and one-tenth, and tail an inch and one-eighth; bill to forehead seven-sixteenths of an inch, and tarse half an inch. Above, brownish-olive; beneath, dull greenish-white: bill and legs brownish-cinereous: sexes alike. Frequents the highest branches of lofty trees on the Malabar range and Neilgherries: and

D. Tickellia, Nobis; *Nectarinia minima*, Tickell, *J. A. S.* II, 577. Length three inches to three and one-eighth, by six inches across; of wing an inch and three-quarters to one and seven-eighths, and tail seven-eighths of an inch; bill to forehead three-eighths of an inch; and tarse seven-sixteenths of an inch. Above ashy-olive, paler beneath; wings and tail darker: bill pale flesh-coloured, with dusky tip; and legs leaden-brown; irides dark: sexes alike. Habits similar to the last, emitting frequently a loud chirping for its size. This bird is common about Calcutta,—Mr. Hodgson has sent it from Nepâl,—and Captain Tickell mentions it to be common in saul-jungle in Borabhúm and Dholbúm.*

Among the gay-coloured species, there is at least one in Bengal; viz.

D. erythronotum, Auct. Not rare in the vicinity of Calcutta, and occurs in Assam and in the Tenasserim provinces; but I am unaware of its existence in the Indian peninsula. In Tenasserim the *D. cantillans* is likewise numerous; and further south, in the Malay peninsula, Mr. Eyton notices, besides *D. cantillans*, *saccharinum* and *cruentatum* (Horsf.), a new species described by him as *D. ignicapilla* in *P. Z. S.* 1839, p. 105.

Certain species with shorter bills constitute Mr. Hodgson's division *Myzanthæ*, of which the Australian *D. hirundinaceum* is characteristic. Allied to that species is

M. ignipectus, Hodgson. Length about three inches and a quarter, of wing an inch and seven-eighths, and tail an inch and one-eighth; bill to forehead five-sixteenths of an inch, and tarse three-eighths of an inch. Colour of the upper-parts black, with a mingled purplish and green gloss, or, in one Darjeeling specimen before me, they might be termed glossy dark green; under-parts pale buff, with a vermillion patch occupying the greater portion of the breast in the male: the

* Mr. Jerdon has also just obtained a specimen in Southern India.

female is without this, and has the upper-parts glossless olive-green: beak blackish, the base of the lower mandible white in the female; and legs dusky. Inhabits Nepal and Bootan.*

I may notice here a beautiful little Nepāl bird lately sent by Mr. Hodgson, which hardly seems to me to belong strictly to the *Nectarinidæ*, though it is evidently a soft-billed honey-sucker, and I know not what else to approach it to. Mr. Hodgson styles it

Myzornis pyrrhoura. The bill of the specimen is mutilated of its extremity, but would appear to have been slightly curved and pointed, moderately slender, depressed, but the ridge of the upper mandible distinctly angulated; nostrils almost closed by an impending scale; and the gape furnished with some delicately fine vibrissæ of moderate length: tarse longer than the middle toe with its claw; toes of mean length, the outer and middle basally connected; claws moderately curved, that of the hind toe much larger than the others; wings much graduated, having the 4th, 5th, 6th, and 7th primaries subequal, and the 3rd shorter than the 8th: tail even: plumage soft, dense and copious, very puffy over the rump, and the feathers of the head scale-like, but not rigid. Length about four inches and a quarter, of which the bill probably exceeds half an inch from the forehead, and the tail measures an inch and a half; wing two inches and three-eighths; tarse thirteen-sixteenths of an inch; and hind-toe and claw nine-sixteenths of an inch. Colour a fine lively green, becoming bright emerald-green on the scale-like feathers of the forehead and crown, which have well defined black centres; lores deep black, continued to beyond the eyes: underparts paler and tinged with verdigris-grey, having a slight rufous cast on the throat; lower tail-coverts bright yellow: wing-coverts and secondaries green like the back; primaries black, the first eight having white tips, and all but the graduated outer primaries having their exterior edge partly white; secondaries margined with rufous and then with white, except towards their tips, whereon also they have a terminal white spot; tail dusky, washed with greenish, its feathers having

* In the article *Souimanga* by M. Drapiez, of the *Dict. Class. d'Hist. Nat.*, several species are mentioned which are not enumerated in Sir W. Jardine's *Synopsis* of the *Nectariniæ*; and some of these are assigned to Bengal, or to India, (the latter a very vague term as currently employed, being not unfrequently synonymous with what is aggregately called "the East"). I much question, however, if any of these, supposing them to be really distinct, appertain to India proper.

their outer webs dull red to near the tip: bill dusky-horn, and legs apparently have been yellowish-white. Inhabits Nepál.

To another nectar-feeding family — the *Meliphagidæ*, I refer the genus *Zosterops*, which is most extensively represented in Australia, where this family is so largely developed. One Indian species — *Z. Maderaspatanus*, would appear to be tolerably common in most parts of the country, from Nepál to Ceylon, and is numerous also to the eastward of the Bay of Bengal, but I have not yet obtained it in the vicinity of Calcutta. A species from the Mauritius, which I refer to *Motacilla Madagascariensis*, Gmelin, has the bill longer and distinctly incurved, and the tongue long and dichotomously subdivided at its extremity, so as to form a tolerably large brush, as usual (if not constant), among the *Meliphagidæ*. To this family, the genus *Chloropsis* (p. 955, *et seq.*, *ante*.) is generally referred, and Mr. Hodgson inclines to place with it his *Heterornis*, (olim *Cutia*), and even his *Ixops* (vide p. 948, *ante*), but *Heterornis* at least I prefer to range near the *Timaliæ*.

Returning now, after so long a digression, to the catalogue of Darjeeling birds, I have to rectify, at

Page 192, *Linota saturata*, Nobis. This is identical with Mr. Hodgson's *Carduelis Nipalensis*, *As. Res.* XIX, 157, but now typifying his division *Procarduelis*. Of true *Carduelis*, there are two species upon the Himalaya allied to the European Goldfinch,—viz. *C. caniceps*, Vigors, figured in Gould's *Century*; and *C. Burtoni*, Gould, *P. Z. S.* 1839, p. 90; and one belonging to the Siskin group,—the *C. spinoides*, Vigors, which is also figured in Gould's *Century*.

P. 193. *Pica megalopectera*, Nobis, was previously described by M. Adolphe Delessert, in the *Revue Zoologique par la Société Cuvierienne*, 1840, p. 400, and again in his *Souvenirs d'un Voyage dans l'Inde*, pt. II, 30, by the name *P. Bottanensis*. The Society has lately procured a specimen of *P. vulgaris* shot on the Chilian Andes; and another common Indian bird from Peru, the *Ibis falcinellus*. I have reason to believe that *Pica Bottanensis* is the species of Magpie so abundant in Afghanistan: but a specimen brought from Chusan by Dr. Cantor was veritable *P. vulgaris*.

P. 194. *Ampeliceps coronatus*. This bird has lost the corneous sheathing of its bill, but the bone was blackened, and the deception is

by no means obvious: sides of the face naked; and I now think the bird may be safely ranged in *Gracula*, v. *Eulabes*, Cuvier, vide p. 178 (*bis*), *ante*.

After the foregoing corrections and emendations, my paper on Darjeeling birds still contains fifteen presumed new species, of which thirteen have been received from that locality; viz. *Indicator xanthonotus*, *Bucco Franklinii*, *Xiphoramphus* (olim *Xiphirhynchus*) *superciliaris*, *Paradoxornis ruficeps*, *Cinclidium frontale*, *Pteruthius rufiventer*, *Alcurus* (olim *Tricophorus*) *striatus*, *Accentor variegatus* (olim *Himalayanus*?), *Turdus mollissimus*, *Chaitaris grandis*, *Muscicapula rubecula* (*Dimorpha superciliaris*, *passim*), *Phylloscopus reguloides*, and *Linota fusca*: of the remaining two, the *Gracula*? (olim *Ampeliceps*) *coronatus* is most probably from Tenasserim; and *Timixos meruloides* is perhaps Australian. Mr. Hodgson has subsequently sent specimens from Nepâl of *Bucco Franklinii*, *Pteruthius rufiventer*, *Alcurus striatus*, *Turdus mollissimus*, *Muscicapula rubecula*, and has informed me of the occurrence there of *Phylloscopus reguloides*.

I remain, Sir,

Your's obediently,

ED. BLYTH.

Appendix.—I have such a multitude of new species of Birds to describe, and there are so many more groups of them which I think I can elucidate, at least as regards their Indian species, that, notwithstanding the great length of the foregoing Report, I shall take the present opportunity to relieve myself of some portion of this constantly increasing *cumulus*.

Genus Buceros. The various descriptions of Hornbills to which I have access are, for the most part, highly unsatisfactory and perplexing, for which reason I shall contribute my mite towards the elucidation of the species of this group. Those of India are as follow:—

1. *B. cavatus*, Shaw, apud Gould, in *Century* (not a good figure); also apud Jerdon, *Madr. Jl.* Vol. XI, 37, where the following is correctly described from Mr. Elliot's notes: *B. homrai*, Hodgson, *As. Res.* XVIII, pt. II, p. 169 *et. seq.*; with coloured figure and views of the casque at different ages: Dr. Horsfield, however, in his catalogue of Dr. McClelland's Assamese birds (*P. Z. S.* 1839, p. 164), notices that the *Calao à casque concave* of Levaillant, according to Shaw's

description and specific character, differs in various particulars from the present species, and mentions that there are specimens of the latter from Sumatra in the Hon'ble Company's museum. It is also found in suitable districts throughout India (though not, that I am aware of, in Bengal), is frequent in the Tenasserim provinces, and the Society possess specimens from Assam and Arracan. It does not appear to be subject to any variation of plumage, either sexual or according to age; but there are some differences in the colouring of the bill and casque of the sexes, as noticed by Messrs. Hodgson and Elliot, and also of the irides, which in the adult males are intense crimson, and in the females and young hoary.

Not having Levaillant's plates to refer to, I have no means of forming an opinion respecting his *Calao à casque concave*, further than can be derived from the conflicting descriptions of Shaw and others, though founded on those plates; but as his Rhinoceros Hornbill is erroneously represented to have the tail black with a white tip, instead of white with a black cross-band as in the Homrai, I conclude that his plates of the present species are equally untrustworthy, and feel justified in following Gould and others in retaining the name *cavatus* for Mr. Hodgson's Homrai, which, together with *B. rhinoceros* as above indicated, is the only species of its respective subtype that appears to have been verified up to the present time.

The following details shew the confusion that has arisen from Levaillant's figures, which were doubtless made up from imperfect and perhaps *faultily restored* specimens. Stephens, in his continuation of Shaw's *Zoology* (XIV, pt. I, 80), unites the *B. bicornis* and *B. cavatus* of Shaw, assigning Sumatra as the habitat, wherein I presume that he follows Temminck. In Griffith's edition of the *Régne Animal* (VII, 417), and also in the second (French) edition of that work by its illustrious author (I, 446), the *B. bicornis*, Levaillant, pl. VII, is stated to be the adult female, of which *B. cavatus*, id. IV, is the middle-aged male; to which is added that plates III and V represent "altered individuals." The uselessly brief description annexed in Griffith's work is as follows: — "Black with white patch on second quills; protuberance forming a double horn: Philippine Islands." And there is a figure of the bill and casque, assigned to *bicornis*, in Griffith's work, Vol. VII, plate to p. 435, which might pass for

the Homrai, but has the lateral edges of the casque prolonged in front to an extent which I have never seen an approach to on the part of the Indian species, wherein they are usually, if not always, truncated, though it is possible that they might so grow out in captive individuals. Mons. Drapiez, in the *Dict. Class. d'Hist. Nat. (Art. Calao)*, suggests that *B. cavatus*, Cuv. and Lev., may perhaps be no other than *B. cristatus*, Vieillot, figured in the supplementary plates to that work, No. XXIII; but this is quite out of the question, and I shall revert to the consideration of the latter species presently.

M. Drapiez, however, describes *B. bicornis*, Lev., Pl. VII and VIII, as a distinct species, differing altogether from *cristatus* and decidedly from the Homrai, stating, that the under-parts and lateral caudal feathers are white, and omitting all mention of any white, or rather fulvous-white, on the hind-head and neck. Inhabits the Philippines and China. Shaw, also, describes the *B. bicornis*, Lev., Pl. VII, and VIII, to have *the upper part of the breast, belly, thighs, and vent-feathers, white*; but the tail to be crossed in the middle, *except on the two middle feathers, with a white bar*: and he asserts it to be a native of India and the Indian isles; though most assuredly there is no species exhibiting such a coloration in India proper. His *B. cavatus*, Lev., III, IV, V, and VI, is stated to have the face and chin black, and the neck pale ochre-coloured, — so far as in the Homrai; *but the whole remainder of the plumage black* (very doubtful, certainly as regards the tail); and he adds a description which obviously refers to the young of some other species, as applicable to the immature state of this one. He also considers *B. hydrocorax* to be the young *cavatus*, in which opinion, however, he is not followed by Stephens.

Lastly, Shaw gives, as a variety of his *B. bicornis*, the species described by Cameli in the *Philosophical Transactions*, Vol. XXIII, (1702-3), p. 1394; but there is a widely different species (from the Homrai at least) in the Society's museum, which satisfactorily accords with the description by Cameli, and is clearly identical with Vieillot's *cristatus* as figured in the supplementary volume of plates to the *Dict. Class.*; apparently differing only from that figure in having the thighs ferruginous, and the primaries, together with their coverts and the winglet, fulvous-white,—at least on one side, the other having only the three first primaries, and some of their coverts, of that colour,

the rest being blackish. Cameli's specimen is described to have had the primaries fulvous. This is accordingly a somewhat variable species, subject to have the wings more or less fulvous or fulvous-white, instead of brown-black: *au reste*, the Society's specimen has the upper-parts of a dusky, greenish olive-brown; the face to beyond the eyes, and the crown immediately behind the casque, black; belly also black; the remainder of the head and the entire neck deep ferruginous; thighs pale ferruginous; and tail wholly fulvous-white: bill and casque dull coral-red, the terminal half of the former dark and livid, and a slight admixture of this upon the casque. Length nearly three feet, of wing sixteen inches, and tail thirteen inches; bill to gape six inches, and casque five inches, the latter produced backward far over the crown; the shape of it is inflated, and flattened above, narrowing to a point anteriorly, which however does not protrude forward, the greatest breadth being nearly two inches, and there are no transverse grooves either upon the casque or on the bill itself.

The figure cited of this species is rude (the feet not being represented as *syndactyle*), but decisive as regards the specific characters; the upper-parts being coloured brownish-black, the belly black as in the Society's specimen, and the thighs and vent of the same fulvous-white as the primaries of the latter. But the description in the *Dict. Class.* varies in several particulars, representing the upper-parts to be black, but the *under-parts* with the tail-feathers, fulvous-white; upper mandible yellow, red at its point, and surmounted by a casque rounded laterally, much produced backward, and *creusè en gouttière ouverte par devant*; hence the suggestion of M. Drapiez that this species may be *B. cavatus*, but there is no tendency to such a structure apparent in the Society's specimen, which however may be from comparative youth. The total length is given as three feet (French), and that of the bill seven inches. The females and young are stated to be wholly black, which is improbable as concerns the tail.

The same sexual disparity of plumage occurs in several allied species, whereof the males only are more or less marked with rufous; and both sexes are characterized by having a naked and brightly coloured, inflatable, gular skin. At the head of these may be placed—

2. *B. Nipalensis*, Hodgson, *As. Res.* XVIII; pt. I, 178, — the female, with a coloured figure of this sex: the male having the plumage of the entire head, neck, and breast, bright ferruginous, and that of the

thighs, belly, and vent, ferruginous-bay.* The Society possess fine specimens of both sexes of this large species from the Munneepore hills, and Dr. Pearson has a male from the vicinity of Darjeeling, where others have been met with. It has merely a slight bulge in place of a casque, and the upper mandible only is marked with a series of broad transverse grooves, six or eight in number, which appear, with the entire corneous substance of the beak, to be pushed forward from behind, by a constant increment at the base of the beak, and to be successively worn away anteriorly; the same is very obvious in various other species of Hornbill, and the inference deducible from this fact is, that the beak-sheath of birds generally, like their claws, and other modifications of cuticle, continue to grow at base and to be worn away at the extremity, as familiarly exemplified (at least as regards the growing) by the human hair and nails, and in a more or less obvious degree by all analogous productions.

Next follow several species very closely allied together, the males either resembling in plumage the *B. cassidix* figured in Griffith's work (Vol. VII, pl. to p. 434), or having the head and neck uniformly bright rufous, as in the *Calao de Waygiou* (*B. ruficollis*, Vieillot), figured in one of the plates to Labillardière's Voyage, and also the *B. cristatus* (ante); approaching in this to *B. Nipalensis*: the females of all (so far as known) have the head and neck black; and excepting *B. cristatus* and apparently some immediate congeners to that species, the casque is transversely plaited, and the same naked, inflatable, coloured gular skin exists as in *B. Nipalensis*. Such are—

B. pucoran (?), Raffles, obscurely indicated in *Lin. Trans.* XIII, pt. II, p. 293; this being doubtless either the present or the next species, but most probably the present one; and the gular skin is stated to be yellow: *B. ruficollis*, apud nos, ante, p. 176. Male having the medial part of the crown and the whole occiput and nape dark rufous bay, or deep maronne, and the sides of the head and neck, with the front of the latter, glistening yellowish-white,—precisely as in the figure cited of *B. cassidix*, only that the maronne colour is more developed on the occiput and nape than is at least represented in that figure, and forms the usual crest in this genus: all the other parts are greenish-glossed black, except the tail which is buffy-white. Bill yellowish-white, the basal por-

* The same sexual diversity of colouring obtains in the nestling plumage.

tion of both mandibles dark reddish-brown laterally, with a series of narrow, transverse, whitish ridges, nearly similar to those of *B. cassidix*; the casque is scarcely elevated above the outline of the rest of the upper mandible, but is broad and flat above, having a series of narrow transverse whitish plaits, the intervals between which are nearly filled up with a brownish substance, so that the profile is almost even, and towards the front is worn quite so. As compared with Labillardière's figure of *B. ruficollis*, the casque of the present species is less elevated, the plaits are much narrower and closer, and do not reach so far as half way along the mandible; the ridges on the sides of the bill itself afford another distinction from both that species and the next, and approximate the present one to *B. cassidix*. Length above three feet, of the wing nineteen inches, and tail ten inches and a half; bill to gape seven inches and a half, and with casque three inches high, the latter nearly two inches broad. Inhabits Sylhet and the Tenasserim provinces.

B. plicatus (?), Shaw; *B. subruficollis*, Nobis, ante, p. 177. Entirely resembles the last species in its plumage, having the sides of the head and neck (in the male) more or less deeply tinged with golden-saffron: but the size is much inferior, though the wings and tail being proportionally longer, the difference in actual admeasurements is not great, though that of the weight would be considerable; the casque is also much more elevate and highly convex, instead of being flattened above; the plaits on it more resembling those of *B. ruficollis*, except that they are considerably more raised than in that species, though far less so than in *cassidix*, and the foremost incline close over the bill as in *ruficollis*; there are also, as in *ruficollis*, no lateral transverse ridges at the basal part of the mandibles, which is a further distinction from *cassidix* and (presumed) *pucoran*. Length about thirty-two inches, of wing sixteen and a half, and tail nine and a half; bill to gape six and a half, and with its casque nearly three inches high, of which the latter occupies a full inch; it is also broad behind, becoming gradually narrower to the front, whereas that of *pucoran* (?) is much more uniform in its breadth throughout. Likewise an inhabitant of the Tenasserim provinces, where apparently very common.

This would seem to be the *B. plicatus* of Shaw, said to inhabit Ceylon, which I much doubt; and I certainly do not believe that it

would ever have a black tail with white outer feathers, as Shaw mentions to be the case sometimes (this being characteristic of *B. Malabaricus*, the young of which Cingalese species was probably here confounded with the present one). Stephens annexes, as synonyms of *B. plicatus*, the *B. undulatus*, Shaw, and *B. Javanicus*, Shaw. The latter is described to have the head "pale rufous," whilst in seven male specimens of the present species before me, the head is invariably very dark rufous-bay, or deep maronne: *B. undulatus*, also from Java, is described to have, "at the lower part of the neck, between the shoulders, a moderately large patch of red-brown, adding a considerable ornament to the plumage of that part"; the present bird has nothing of the kind: the female *Javanicus* is stated to be "somewhat smaller, and destitute of the reddish-brown patch between the shoulders."

This may also, rather than the preceding species, be the Sumatran *pucoran* of Raffles, which is stated to have a yellow gular skin: that of *undulatus*, together with the orbits and the space immediately between them and the upper mandible, is described as bluish; that of *Javanicus* as yellowish-white. The two species here described are undoubtedly the two allied Tenasserim races mentioned by Mr. Barb (*J. A. S.*, X, 922), as differing only in the colour of the naked skin of the throat and around the eyes, which in one is of a beautiful blue, and in the other an equally rich yellow: it is impossible to form any decided opinion from the dry specimens; but it would seem from them that the larger or *pucoran* (apud nos) is the yellow-throated species, and the smaller or *plicatus* the blue-throated.

In Griffith's work (VII, 418), *B. Javanicus* is placed among the species without a casque; and I have no confidence in the synonyms attached, particularly as the *Calao de Waygiou*, or *B. ruficollis*, Vieillot, is included among them. There are evidently several allied species which require further investigation, unless they have been subsequently elucidated, which is most probable.

In a series of nine specimens before me of *B. plicatus*, the curious fact of the successive advance forward of the ridges of the casque, in consequence of the growth from behind, is particularly manifest. In none of these specimens does the number of transverse ridges exceed seven, and it is obviously apparent, upon inspection of the series of

specimens, that these ridges are thus pushed forward till they finally scale off anteriorly, while others are continually in process of formation behind; also that in young birds they are individually much larger and thinner in substance, becoming narrower and closer by degrees. I remember making an analogous observation in the instance of the very remarkable long-legged Abyssinian Hornbill (or *Abba Gumba* of Bruce, sub-genus *Bucorvus* of Lesson), the casque of which forms a hollow tube, open in front in the adult, and which continually advances forward, the extremity shredding off, from time to time, in form of a ring. We have seen that the transversely grooved plating on the sides of the base of the upper mandible of *B. Nipalensis*, and necessarily of *cassidix* and what other species possess an analogous structure, is constantly renewed behind and worn away in front in like manner.

I now return to the ordinary Hornbills without a gular bag, and of which the sexes are similar in plumage, as exemplified by *B. cavatus*, *rhinoceros*, *Malabaricus*, &c. It is among these that the casque attains its maximum dimensions, being generally not large in the preceding group. I have already remarked that Levaillant's figure of *B. rhinoceros*, which is copied by Shaw, represents the tail to be black with a white tip, and the rest of the plumage to be wholly black; whereas the considerable number of specimens which have passed under my observation have invariably had the thighs, vent, and lower tail-coverts, white, and the tail white with a black cross-band as in *B. cavatus*: a circumstance which tends exceedingly to diminish our faith in the alleged colouring of *B. cavatus*, as distinct from the Indian Homrai. Sir Stamford Raffles rightly remarks that the female of *B. rhinoceros* is smaller, with the horn more recurved; and that the iris is white, while that of the male is red: this corresponds with Mr. Hodgson's observation of the diversity of colour of the irides in the sexes of *B. cavatus*, and which probably obtains likewise in *Malabaricus* and some others.

The two next have been much confounded, for which reason I shall describe them fully.

3. *B. Malabaricus* (verus), Latham; *B. monoceros*, Shaw, and probably also *B. violaceus*, Shaw: *Bægma Dunnase* of Lieut. White, *As. Res.* IV, 119. Black with white under-parts from the breast, also the tips of the primaries and secondaries, and the entire three outer

tail-feathers on each side, with more or less of the next pair: bill and part of the casque yellowish-white, having a flesh-coloured spot at the base of the lower mandible, spreading on the throat, which is bare of feathers except along its middle; contiguous to this, the base of both mandibles is black, extending obliquely downward and forward from before the eye, also the hind-margin of the casque (in the male only), and a large patch of the same occupies the anterior three-fourths of the casque in old specimens, but never reaches downward to the upper mandible (as in the next species): casque very large, and exceedingly compressed laterally, protruding far backward over the crown, and its ridge terminating in an acute angle anteriorly, being prolonged considerably beyond the junction of the casque with the upper mandible. Female similar but rather smaller, the bill and casque proportionally not so large, there is no black on the hind-edge of the latter, and the irides are also probably not crimson as in the male. The young have at first no black on the incipient casque, which appears and increases in quantity with the growth of the latter. Entire length of an adult male nearly three feet, of which the tail measures nearly fourteen inches, and the bill from gape seven inches, being with the casque four inches high; closed wing thirteen inches, and alar expanse three feet and a quarter. Inhabits the peninsula of India, being replaced to the eastward by the next species. Raffles, indeed, includes it in his catalogue of Sumatran birds; but *B. albirostris* has been so frequently confounded with it, that the latter is perhaps here meant, the more especially as Dr. Horsfield includes *B. albirostris* in his catalogue of the birds of Java: possibly, however, both of these notices refer to the *B. bicolor* of Eyton, which I will describe presently.

B. violaceus of Shaw is stated to resemble *Malabaricus* in size and plumage, except that its glosses are brighter and more iridescent, and that "the base of both mandibles, as well as that of the casque, is ornamented with a band of crimson, which at the base of the lower mandible extends to some distance beneath the eyes, and is crossed by two narrow black bars." Described and figured by Levaillant from a living specimen, said to have been brought from Ceylon; and a figure of the bill and casque is given in Griffith's work (VII, plate to p. 435, being doubtless copied from Levaillant), wherein the

casque is represented as essentially similar to that of *Malabaricus* of corresponding age, but the black is not continued forward to its tip, and there is a white or pale line throughout the length of the casque near its ridge, which is not mentioned to occur by Shaw; Capt Tickell, however, in his description of *Malabaricus* (*J. A. S.* II, 579,) mentions "a broad lateral irregular line of yellow, occupying nearly the whole length of the casque;" but this does not occur in the specimens which he has presented to the Society, unless the lower border of the casque be intended, which is not probable; and he does not mention any crimson at the base of the bill, but only the flesh-coloured base of the lower mandible and adjoining black, as usual. At most, I conceive that *B. violaceus* is but an occasional variety of *B. Malabaricus*, and which needs verification.

4. *B. albirostris*, Shaw; *B. leucogaster*, Nobis, *J. A. S.* X, 922, — the young: generally placed as a synonym of *Malabaricus*, which species it represents in Bengal, Nepal, Assam, and the Tenasserim provinces, and according to Dr. Horsfield it likewise occurs in Java. Its size, however, is much inferior, and the four pairs of lateral tail-feathers are only tipped with white: the casque, also, is much less compressed, in fact considerably bulged or inflated, and the black patch upon it is much smaller, appearing only on the extreme tip of the ridge, but spreading downward and backward over part of the middle of the upper mandible, which latter it never reaches in *Malabaricus*; the cutting edges of both mandibles are also more or less black in *albirostris*. Length of wings and of tail ten or eleven inches only. The finest head before me measures six inches and a half from point of upper mandible to gape, the bill and casque being above three inches and three-quarters high, of which the latter is half; length of casque seven inches, the hind portion protruded far backward over the crown, and the anterior part gradually narrowed, and terminating in a less acute angle (as viewed laterally) than in adult *Malabaricus*. Throat but partially feathered as in that species, and the same fleshy spot at the extreme base of the lower mandible.

Allied to these are some species in the Malay countries, as apparently the *B. Malayanus* of Raffles, and the following:—

B. bicolor, Eyton, *P. Z. S.* 1839, p. 104. Wholly black, except the terminal three inches and a half of all but the middle pair of tail-

feathers, which are white: the beak and its casque are spotless yellowish-white, excepting the base of the former and hindmost part of the latter, which are black: head crested, as usual. The casque is allied in form to those of the two preceding species, but especially to that of *B. albirostris*, being less inflated than in the latter, and much less compressed than that of *B. Malabaricus*; moreover, its front does not project forward as in the last mentioned species. Length about two feet and three-quarters, of which the middle pair of tail-feathers rather exceed fourteen inches, these being two inches longer than the next pair, and the rest graduating but slightly; wing twelve inches and a half; bill to gape five inches and a half, and casque rather exceeding five inches. The young, according to Mr. Eyton, have the incipient casque black. Originally described from the Malay peninsula, but the Society's specimen is probably from the Moluccas.

5. *B. Ginginianus*, Shaw: *Putteal Dunnase* of Lieut. White, *As. Res.* IV, 121: common Grey Hornbill of India generally. A small species, with a low and compressed casque, the ridge prolonged anteriorly to a very acute angle, and the hind part concealed by the feathers of the forehead, and not extended backward over the crown. General colour grey, paler below, and from the breast gradually albescent; ear-coverts darker, and a light streak over the eye; primaries and secondaries dusky, the latter margined with grey, and all tipped with white; tail also black near the end, and tipped with white. Bill and casque dusky, the tips and ridges of both mandibles whitish.

In the colouring of the tail of this little species may be discerned a slight approach to the extraordinary Helmeted Hornbill (*B. galeatus*) of the Moluccas, wherein the middle pair of tail-feathers, which in the present species and some others exhibit a marked tendency to be prolonged considerably beyond the rest (as in *Prionites*, *Crypsirina*, &c.), attain an extraordinary development; and it is remarkable that in *B. galeatus* the portion of them chiefly from the tips of the next pair to the subterminal dark band are generally much nibbled away by the bird, except when quite newly put forth, and to such an extent in the Society's adult specimen, which has one of its long middle tail-feathers new and the other old, that, in the latter, the barb is pretty well bitten away, as so usual in *Prionites*. This latter singular genus, which presents the nearest approach to the Hornbills in the

New World, (very much more than the Toucans, which are far more closely related to the Barbets,) is provided with an efficient serrature to both mandibles, by means of which the species nibble away the web of their middle tail-feathers at that part so closely, that it sometimes requires a magnifier to perceive that the truncation is artificial; still it does not appear that this can be cited among the tokens of affinity which connect *Buceros* and *Prionites*, for in other birds having the same form of tail, which exhibit no particular affinity for these *Syndactyli*, as *Crypsirina* for instance, the same nibbling of that part is frequently apparent.

Having mentioned *B. galeatus*, I am induced to add, that observation of the habits of this species, more than of any other, is likely to acquaint us with the intent of that rostral appendage for which most of the members of this genus are so remarkable. *B. galeatus* has a short and nearly straight, and thus powerful, beak, and its casque has a mass of solid bone anteriorly, to which no other species appears to offer the slightest approach: now this must be for work of some kind, requiring extraordinary protection for the forehead; and other species constantly wear the casque away in front, by some means: moreover, in seeming reference to the liability of the excrescence to detach particles from above, the eyes of these birds are protected by very stout lashes, as is also the case with the *Crotophagæ* of tropical America, which have likewise a rostral protuberance very similar to that of several of the smaller Hornbills; but the lashes are equally found in those Hornbills which have the appendage small or altogether wanting, as well as in the Coucals (*Centropus*) and various other *Cuculidæ* additional to *Crotophaga*: the presence of eye-lashes is, however, very rare in the class of Birds, the only other groups which I remember as possessing them being the *Raptores* generally (which have slight lashes), the *Cursores* or Ostrich group, and that extremely remarkable and isolated American bird the Hoazin (*Opisthocomus*), which can be approximated to nothing else.

Another peculiarity of the Helmeted Hornbill is its naked neck and interscapular region, which, added to its short beak, and solid-fronted casque, and the extraordinary length of its middle tail-feathers, seems to indicate this bird as a subgeneric form of *Buceros*, quite as distinct in the *Bucorvus* of Lesson founded on the long-legged Abyssinian species.

The only remaining Indian Hornbill is

6. *B. Gingalensis*, Shaw; *B. Bengalensis*, Gray, in Griffith's work, though extremely doubtful as even occurring in Bengal. Size of *B. Ginglyaninus*, the beak large but without a casque (vide figure in Griffith's work, VII, pl. to p. 435): "the colour of the upper part of the head and the back is blackish brown, with a cast of bluish-grey, the smaller coverts edged with black, marking out that part of the plumage into so many scale-like divisions: the face and under-parts are greyish-white, deeper on the belly and thighs: the two middle tail-feathers are bluish-grey, and the rest somewhat deeply tipped with white." Originally described from Ceylon, and also frequents lofty jungle on the Malabar coast. The Society possess no specimens.

Halcyon Smyrnensis, var. ? *albobularis*, Nobis. Differs from *H. Smyrnensis* in having the white of the under-parts confined to the throat, and the black wing-patch extends over the entire coverts, excepting those of the primaries and the winglet, and also replaces the rufous on the shoulder of the wing. Habitat uncertain. Among a great number of Indian specimens of *H. Smyrnensis*, I have found no variation whatever, the plumage being exactly as described by Mr. Strickland in *An. and Mag. Nat. Hist.*, August, 1842, p. 443, this description having been drawn up from a Syrian specimen: and I may remark that the young bird, in its first plumage, is marked and coloured precisely as in the adult, only its hues are not so bright, and the bill is dusky above with a yellow tip.

Picus, subgenus *Gecinus*, Boié; the Green Woodpecker group, exemplified by *P. viridis* and *P. canus* of Europe, specimens of both of which are in the Society's museum, the latter species received from Norway. This subgeneric form, peculiar to the old continent, has numerous representatives in India and the neighbouring countries. Two species are figured in Gould's Century of Himalayan birds, but in disadvantageous contrast to the later figures by that naturalist; and there are others nearly allied and hitherto confounded with them.

1. *P. squamatus*, Vigors, *P. Z. S.* 1831, p. 8; Gould's Century, pl. XLVIII: *P. dimidiatus* (?), apud Hardwicke and Gray, not of Temminck and Wagler. Length thirteen inches and upwards, of

wing six inches and a quarter, and middle tail-feathers five and a quarter; bill to forehead an inch and three-quarters. Upper-parts rather dull green, the rump and upper tail-coverts much brighter yellowish-green: throat, fore-neck, and breast, greyish, without any markings; the breast slightly tinged with grey in some, and always the sides of the neck, passing into the hue of the nape: under-parts from the breast white, each feather subterminally margined with dusky-black, and a few having also a slight line of the same on part of the shaft; the under tail-coverts doubly marked with arrow-head bars: primaries dusky, with a series of white spots barring their outer webs, and the margin of their inner webs towards the base; the rest of the large wing-feathers barred throughout the margin of their inner webs, as seen conspicuously on the under surface of the wing: each feather of the tail is also conspicuously barred throughout on both webs: the outer margins of the secondaries and tertiaries, together with their larger coverts, are obscurely barred with a lighter colour; and the primary coverts and the winglet are marked like the primaries. The male has the forehead and crown crimson, and the occiput inclining to scarlet; which parts are in the female black, the feathers laterally margined with light grey, as is also a streak from the corners of the mouth in both sexes, which is bordered above by a white one continued from the nostrils, and this again surmounted by a black one between the bill and eye; there is also a white streak over the eye: bill yellowish, the base of the upper mandible dusky. The young have a mottled appearance, the margins only of the feathers of the upper-parts being green, bordering a dusky tint; the barring of the tertiaries is more developed; and the breast and lower-part of the fore-neck are marked nearly like the belly, whereon the black portion of each feather is much broadened internally, contracting the pale medial space within: the crimson tips of the coronal feathers of the young male are much less developed than in the adult, and there is scarcely a trace of red upon those of the occiput: bill chiefly blackish. Gould's figure of this species is much over-coloured, representing a green breast, instead of greyish with at most a very faint tinge of green; and the wings should be much more sombre olivaceous-green; the abdominal markings are likewise badly represented. Hardwicke's figure assigned to *P. dimidiatus* by Gray, would appear also to be a bad representation of the present species,



with the barred appearance on the secondaries and tertiaries much exaggerated. The *P. squamatus* appears to be peculiar to the Himalaya.

The following two species appear to be confounded under *P. squamatus* in Mr. Jerdon's list:—

2. *P. striolatus*, Nobis. Smaller and brighter-coloured than the preceding, with the throat, neck, and breast, marked nearly like the belly, and the caudal bars almost obsolete, except on the middle pair and exterior web of the outermost pair of feathers in some specimens. Length about eleven inches, the wing five inches, and middle tail-feathers four inches; bill to forehead an inch and a quarter. Head and upper-parts like those of *P. squamatus*, but the colours brighter; the dark streak from the corners of the mouth inconspicuous, from the black being reduced to a narrow medial line on each feather; and there is no black mark occupying the upper half of the loreal feathers: the entire under-parts are whitish, not suffused with green as in the next species, but streaked with dusky green, more or less dark on the breast, and always greenish-black on the belly; upon the throat and fore-neck the feathers have each a mesial dark line, more or less defined, which on those of the breast and sometimes above it widens, and is divided to near the tip of the feather by a central whitish streak, which latter also widens on the belly till the feathers of that part present much the same appearance as those of *P. squamatus*, only that a mesial dark line within the white is a great deal more prevalent, and the general aspect of the markings is somewhat less clearly defined than in that species: the sides of the neck are greenish and more obscurely streaked, and the nape and interscapularies are in some specimens indistinctly marked like the feathers of the breast: bill yellowish, the ridge of the upper and tips of both mandibles dusky. Female analogous to that of the preceding species. The Society possess specimens from the Himalaya and Central India, and have received this together with the last species from Mr. Hodgson, who failed to discriminate them.*

3. *P. viridanus*, Nobis. Size about that of the last species, and much resembling it, but the neck, breast, and under-parts very deeply tinged with green, having a strong fulvous cast, and the tail longer,

* More recently, however, Mr. Hodgson has distinguished these two species.

and spotted instead of barred with fulvous white, which in some specimens is obsolete on all but its middle pair of feathers. Length about twelve inches, of wing five inches and a half, and tail four and a half; bill to forehead an inch and three-eighths. Head as in *P. squamatus*, the ear-coverts grey, and streak from the corners of the lower mandible as in *P. striolatus*, on broad and consisting of white feathers having a black central line, which in *P. striolatus* is less strongly defined, and the streak is in that species so nearly similar to the striated adjoining plumage as to be little conspicuous: throat greenish, contrasting with the streak from the corners of the mouth; and the neck green deeply tinged with buff all round, having only indistinct striæ in front; breast the same, the markings becoming more defined, and on the belly they are strongly defined; the ground-hue of the breast is deeply suffused with fulvous-green, having a dark green double streak on each feather uniting at the tip, and a narrow medial line upon the shaft, the lateral edges of the feathers inclining to be albescent; on the belly the ground-hue is whiter, and the marking of the feathers is nearly as in the foregoing species, but with sap-green, instead of black as in *P. squamatus*, and greenish-dusky as in *P. striolatus*: on the sides of the breast, or rather of the fore-part of the abdomen, the feathers have a broad dark green streak on their outer web, away from the shaft, and a narrow one on their inner web adjoining the shaft, besides which the lateral edge of the inner web is also dark green; the corresponding feathers of *P. striolatus* have the whitish part much broader, and containing a broad mesial streak of greenish-black, which again has a central white mark in some: the upper-parts resemble those of *P. striolatus* in brightness of colouring; and the middle tail-feathers are marked with dingy pale spots along the exterior of both webs, more or less trace of which exists also on the outer webs of the other tail-feathers: bill black, the lower mandible bright yellow except at tip. The female I have not seen. A male in its first plumage has all the colours duller, and the markings of the breast and under-parts very indistinct. The Society's specimens are from Arracan, except the young one which was obtained further South, being the so-termed *P. squamatus* of Vol. X, p. 923. Mr. Jerdon, however, clearly enough indicates this species in the description of his *P. squamatus* of Southern India.



4. *P. occipitalis*, Vigors, *P. Z. S.* 1831, p. 8; Gould's *Century*, pt. XLVII: *P. barbatus*, Hardwicke and Gray, apparently a bad representation of the female: *P. affinis* (?), Raffles, *Lin. Trans.* XIII, pt. II, 288, which name would hold precedence. Length about twelve inches and a half, or perhaps thirteen inches in the recent specimen, of wing six inches, and middle tail-feathers four and a half; bill to forehead an inch and five-eighths. General colour green, but much less vivid than represented in Gould's figure, the rump brighter and more yellowish green as usual, though in one of eight specimens before me the hue of the rump is all but uniform with that of the rest of the upper plumage, and the same specimen has also the tail quite plain, whereas in all the rest the middle tail-feathers are barred (in general conspicuously) with dingy greenish, and occasionally the other tail-feathers obscurely so, especially the outermost: the under-parts likewise vary, being in some nearly as bright green as the upper, and in others pale dusky-ash, with sometimes a few green and partially green feathers intermixed: throat pale; the sides of the head grey; a black streak from the corners of the mouth, the feathers of which are laterally edged with grey in the female; and crown of the male crimson, the occipital region black continued to the nape,—the crown of the female being black with grey lateral edges to the feathers, and the occiput pure black as in the male: primaries and their coverts barred with a series of white spots on their outer webs, and wings underneath marked as usual in the group: bill wholly dusky black. Inhabits the Himalaya, and also the Tenasserim provinces; likewise Sumatra, if this be the *P. affinis* of Raffles, described as follows:—

“This species is about ten or eleven inches in length, dusky-green above, with a shade of yellow on the lower part of the back; cinereous or slightly ferruginous below, mixed with brown on the abdomen. Quill-feathers brown spotted with white. Tail-feathers brown, pointed as usual in this genus; the two uppermost with a few light-coloured spots along their inner margin. A gray patch encircles the eyes, bounded below by a black stripe mixed with white spots, which runs from behind the lower mandible. In the male the crown of the head is red, often variegated with black, each feather being black at the base and red at the tip; in the female it is entirely black.

The bill and feet are blackish-blue." I have italicized the few particulars wherein it would appear to differ from the species above described, and considering its alleged inferiority of size, I think that it will not improbably prove distinct.

The two next species resemble in having a nuchal crest of brilliant yellow silky feathers, much as in *P. (Brachylophus) mentalis*, which is also a green-bodied species, though pertaining to a different subgroup, of Woodpeckers; and the first of them has also, the primaries barred with ferruginous and black, nearly as in *P. mentalis*, and also much resembling the general colouring of *P. pyrrhotis*, Hodgson, *J. A. S. VI*, 108, which latter species, so far as I can judge from a young specimen, would seem to be best ranged in *Gecinus* (the subgenus under consideration) : in other respects, the two following Woodpeckers do not appear to be particularly allied, further than that in both the rump is nearly or quite of a uniform green with the back.

5. *P. flavinucha*, Gould, *P. Z. S.* 1833, p. 120; *P. flavigula*, Hodgson, *J. A. S. VI*, 106, which see for description. It appears to be not uncommon in Nepál, and also in Arracan.

6. *P. Nipalensis*, Hardwicke and Gray, *Ill. Ind. Zool.*, badly figured; *P. mentalis* apud Jerdon, *Madr. Jl. Vol. XI*, 214, but not *P. (Brachylophus) mentalis* of Temminck. Much smaller and less robustly formed than the preceding species. Length about nine inches and a half, the wing five and a quarter, and middle tail-feathers four and a half; bill to forehead about an inch. Colour of the upper-parts bright green, the throat whitish, with dusky tips to the feathers, which latter become so much developed on those of the foreneck and breast, that these parts appear wholly dusky, having sometimes a slight ashy, and sometimes a greenish, cast; belly and flanks dingy whitish, with dusky cross-bars: lores whitish, surmounted by black, over which (in the male) commences a crimson streak meeting its opposite on the forehead, and continued backward to the occiput, this crimson being confined to the occiput in the female; the white of the lores is continued as a streak to the lowermost ear-coverts, and the male has an admixture of crimson on the moustachial plumes: the large wing-feathers are bright ruddy on their outer webs (anterior to the emargination of the primaries), which are margined with green, slightly on the primaries and deeply on the secondaries and ter-



tiaries; underneath, the wings are dusky, barred with greenish-white: tail blackish, its middle pair of feathers margined with ruddy-green: bill dusky, laterally marked with yellowish except at tip; "legs sap-green; irides reddish-brown" (Jerdon). Common on the Himalaya, and occurs rarely in other parts of India, including the vicinity of Calcutta.

Mr. Jerdon suggests that the *P. chlorolophus* of Vieillot may be the young bird. In the *Dict. Class.*, I find a *P. chloropus*, Vieillot, from Bengal, described, which is most probably a variety only of the present species, in which case the name would take precedence. It sufficiently agrees in general respects, except that the supercilium and a subocular line are stated to be pointed with yellow, instead of crimson, the primaries are said to be externally spotted with yellowish-white, and the throat and fore-part of the neck to be greenish, which last is fully applicable to many specimens.

In *Proc. Zool. Soc.*, for 1841, p. 31, Mr. Strickland indicates three groups of Woodpeckers included under *Brachylophus* of Swainson; viz. the green Woodpeckers (*Gecinus*, Boié),—the crimson-winged species (*miniatus*, *puniceus*, and *mentalis*), to which he proposes to restrict Mr. Swainson's term *Brachylophus*,—and the short-thumbed species, exemplified by the commonest of Indian Woodpeckers (*P. aurantius*, Lin., v. *Bengalensis*, Gm., v. *nuchalis*, Wagler, v. *hemipodius*, Swainson), which group he characterizes by the appellation *Brachypternus*. This last division, however, still does not appear to me to be rightly constituted, but comprises two very distinct forms, namely, that of the rudimental-thumbed *P. aurantius*, which I think should be placed with those Indian species (*Chrysomotus*, Swainson, comprising *P. tiga*, *Shorei*, and *Grantia*,) wherein the thumb entirely disappears, and in this case the name *Brachypternus* would be no longer applicable; the other group having a well developed fourth toe, and being altogether much more powerfully formed, and highly typical or characteristic of the Woodpecker structure. To this last, which may be designated *Chrysocolaptes*, appertain *P. strictus*, Horsfield, (v. *sultaneus*, Hodgson),* *P. hæmatribon*,

* This is generally, I believe, now considered to be *P. Goensis*, though the description of the latter by Daubenton and others certainly does not apply.—Referring to Dr. Horsfield's catalogue of Javanese birds prefixed to his Volume of Researches, I observe that he there refers his *P. strictus* to *P. Goensis*.

Wagler, and also I believe certain other species, together with the following :—

P. (Chrysocolaptes) melanotus, Nobis. Length above a foot, of which the tail exceeds three inches and a half; wing six inches; beak to forehead an inch and seven-eighths; long hind-toe and claw an inch and a half; short hind-toe and claw three-quarters of an inch. Crown and occiput of male splendid carmine, less crimson than in *P. strictus*, but otherwise nearly similar, only not converging to a peak behind; forehead mingled black and white; a white streak commences behind the eye, and is continued to the nape, the entire hind-part of the neck being wholly white, much more broadly so than in *P. strictus*, and extending down upon the interscapularies; the rest of the back, rump, tail, and scapularies, are brownish-black, having a slight aureous cast on the last; wings bright golden-yellow, less vivid on the volar feathers and their larger coverts; the bend of the wing, with the winglet, and the coverts of the primaries, dull blackish; primaries dusky, having distantly placed large round whitish spots on their inner webs, and dull similar spots on the outer webs of those contiguous to the secondaries; there is a broad black streak down the sides of the neck from the eye; and the under-parts are handsomely streaked, commencing with three black stripes on the throat upon a white ground; on the breast the feathers are white with black lateral edges, which last gradually almost disappear on the belly: bill blackish; feet apparently have been lead-coloured; and the irides are marked to have been "brilliant pink-red." This beautiful bird was obtained near Midnapore.

I have other Woodpeckers to describe, but they require some further elucidation at present; and of allied forms, Mr. Hodgson has recently sent the *Picumnus innominatus*, Burton, *P. Z. S.* 1835, p. 154, vel *Piculus* (olim *Vivia*) *Nipalensis*, Hodgson, *J. A. S.* VI, 107, which is perfectly true to the generic type of *Picumnus minutus*, Tem., of the West Indies and Guiana; and the *Comeris* (olim *Sasia*) *ochracea*, Hodgson, *J. A. S.* V, 778, which I suspect will come under the *Microcolaptes* of Temminck, founded on his *Picumnus abnormis*. The *Sasia ochracea*, Hodgson, was obtained by Dr. McClelland in Assam.

[The following I have just received from Darjeeling.

Picus (Dendrocopus, Sw.) cathpharius,* Hodgson. Length about seven inches and a half, of wing four inches, and middle tail-feathers two and a half; bill to forehead seven-eighths of an inch. Colouring as in *P. Himalayanus* (XI, 165), except that the under tail-coverts are not red, and the crimson of the occiput extends behind the ear-coverts to the black streak below them, tending to be continued into a gorget on the breast, where the feathers have a crimson tinge: the bill also is proportionally much smaller than in that species, and of a white colour; and the tail is less rigid and pointed: — the general form being that of the European *P. minor*. Upper-parts black, with a white wing-patch, and series of white spots on both webs of the large alars: lower-parts fulvescent-brown, the feathers below the fore-neck having mesial black streaks; there is a black stripe from the lower mandible along the sides of the neck, and above it a whitish stripe through the eyes to the ear-coverts inclusive, commencing on the sides of the forehead; the two outer tail-feathers are barred with whitish, and the next one spotted with the same on its outer web only; and the occiput of the male is crimson as described, extending laterally behind the ear-coverts. A Nepalese female in nestling dress (sent by Mr. Hodgson) is rather smaller, with no red on the occiput, but traces of it on the breast as in the adult male; and the outer tail-feathers have the pale bars broader than the black ones, being the reverse of what is seen in the adult: bill chiefly dusky.]

(*To be continued.*)

Addenda.—As the remainder of the foregoing Appendix will appear in a subsequent number, I shall introduce here a few notices referred to in a note to p. 941, ante.

Rhizomys from Arracan, p. 925. I have just seen two specimens of the true *Rh. badius*, Hodgson, from Darjeeling; and the species is distinct from the Arracan one, although Mr. Hodgson's description of *Rh. badius* will apply to either of them. The Nepalese species is in colour wholly slaty-grey, having the fur of the upper-parts tipped with dark rufous-brown, but shewing only a slight trace of this hue on the under-parts, which are glistening dark cinerascens; the brown

* A latinization of different native names, or rather modifications of the same name, for Woodpeckers in general.

tips of the dorsal fur are also somewhat glistening; and the feet are dark. The other I now designate

Rh. castaneus, Nobis. Size and structure of the preceding, but the entire colour very much lighter, and the fur considerably less dense: base of the piles pale dusky-ash tipped with vivid light chesnut-bay, which is denser and consequently appears brighter on the cheeks and sides of the head: under-parts merely paler than the upper, the faint ashy hue of the bases of the piles inconspicuous: feet semi-nude and flesh-coloured; the claws pale: and towards the cleft of the upper lip albescent. Inhabits Arracan.

Note to p. 928. Among some Darjeeling mammalia lately collected by Capt. Charleton, is a beautiful specimen of the *Felis marmorata*, Martin, *P. Z. S.* 1836, p. 107; which, like the *F. macrocelis* (to which it is allied), was originally described from a Sumatran example. It is the species referred to *F. Diardi* in the volume on *Felinæ* in the 'Naturalist's Library.'

Note to p. 933. Mr. Hodgson now suggests the name *Hemirhynchus* in lieu of *Temnoris*.

P. 938. Capt. Charleton also possesses a specimen of *Sitta formosa*, Nobis, the wing-primaries of which agree in relative proportion with those of other Nuthatches: and he has several examples of the green *Kitta* according precisely with that described, which, as Mr. Hodgson informs me, are merely in the ordinary plumage newly put forth, the colour changing to blue after a certain amount of exposure.

The same collection has also yielded a fourth species of my genus *Cyornis*, as alluded to in a note to p. 941; viz.

C. unicolor, Nobis. Differs from the three others, in having no ferruginous on the under-parts; whilst the upper are of a lighter blue than in *C. rubeculoides* and *C. banyumas*, and of a much brighter and less greyish blue than those of *C. Tickelliae*: lower-parts paler and tinged with verdigris, being still lighter on the belly. The only specimen examined was killed while moulting, and retains many of its mottled nestling feathers, especially upon the head and throat, also the wing-coverts, and an intermixture of them on the bright blue dorsal plumage: these nestling feathers are pale fulvous-brown with narrow black margins on the clothing plumage, the wing-coverts are dusky with pale fulvescent tips, and the large alars are tinged with

cyaneous, the tertiaries having small fulvescent tips like the wing-coverts. Length about six inches and three-quarters, of wing three and one-eighth, and tail two and three-quarters; bill to gape thirteen-sixteenths of an inch, and tarse five-eighths of an inch. Occurs at Darjeeling.

P. 942, *note to preceding page.* No. 51 of the birds of Capt. Tickell's list.—Since this was printed, Mr. Jerdon has written me word, among other matters, — “I have also another Barbet sent from the west coast, very like *viridis*, but distinct, and evidently the *Bucco lineatus* of Tickell's list.”

Note to p. 952. Mr. Hodgson informs me that the word *leucopoplus* alluded to, was, as I suggested, a copyist's mistake for *leucolophos*; and I perceive that there is an “*Ianthocincla leucocephala*, Gould,” mentioned in a list of Bengal birds published in the ‘Annals and Magazine of Natural History’ for June, 1842, p. 477, which I also suspect is intended for *leucolophos*.

P. 961. *Pitta gigas*, apud nos. In a very interesting collection just received from Arracan, there are two fine specimens of this *Pitta*, which I now think must be distinct from *P. gigas*, in which case the species might be termed *P. cyanea*. These birds have the crown brown, with a black medial stripe, the occiput bright red, and throat whitish, having a black stripe on each side; the rest of the upper-parts are entirely of a fine blue, and the lower pale blue, sullied with green on the breast, and mottled with black as described. Length about nine inches.

P. 966 *Phylloscopus magnirostris*, Nobis. The same collection has yielded a second specimen of this new species.

P. 969 et seq. *Nectarinia, Dicaeum*, &c. Three species of this group are also sent, of which two appear to be new; viz.

Nectarinia Phayrei, Nobis. This beautiful species pertains to the group exemplified by the Indian *N. Zeylonica* and *N. minima*, and nearly agrees with Sir W. Jardine's description of *N. Hasseltii*, Tem., in the *Nat. Libr.*, but has the “mantle,” or at least the interscapular region, deep black. Length about three inches and three-quarters, of wing an inch and seven-eighths, and tail an inch and a quarter; bill to forehead half an inch. Crown brilliant golden-green, the feathers of soft and disunited texture; cheeks, sides and back of the neck, inter-

scapularies, and wings, deep black; tail also black, richly glossed with purple; scapularies, rump, and upper tail-coverts, brilliant steel-blue; throat and fore-neck splendid amethystine-purple; breast, and flanks anteriorly, rich dark red; posteriorly, with the vent and under tail-coverts, dull greyish-black: bill and feet black. Inhabits Arracan, and is dedicated to its discoverer Capt. Phayre, the present Senior Assistant to the Commissioner of that province, to whom the Society is indebted for numerous zoological contributions of much interest.

Dicaeum chrysochlore, Nobis. A thick-billed species, devoid of shewy colouring. Length about four inches, of wing two inches and one-eighth, and tail an inch and a quarter; bill to forehead three-eighths of an inch. Upper-parts uniform vivid, but glossless, golden-green, including the tertiaries, the margins of the secondaries, and their coverts; the rest of the wing, and the tail, dusky black, the latter margined towards its base with the colour of the upper-parts, and the primaries slightly with yellowish-white: entire under-parts slightly yellowish-white, except the lower tail-coverts which are bright yellow; the breast and flanks being streaked with dusky, and a line of the same proceeds from each corner of the lower mandible: inside of the wings chiefly white: bill and feet blackish. Inhabits Arracan. The third species sent is *D. erythronotum*.

The discovery of *D. chrysochlore* enables me, I think, to classify a very curious little bird, (the affinities of which have long puzzled me,) from Nepál, but which I have not now by me for comparison, as Mr. Hodgson took the specimen away with him. The following is, however, the description which I took of it:—

Pachyglossa, Hodgson, *n. g.* Bill rather short, and very Swallow-like as viewed from above, but less depressed, with the ridge of the upper mandible obtusely angulated, and the terminal half much compressed from the inflection of its tomia; nearly conical as viewed laterally, the outline of the upper mandible curved, and its tip overhanging that of the lower mandible; the outline of the lower mandible is almost straight. Nostrils nearly closed by impending membrane, the aperture forming a narrow slit (in the dry specimen). Gape unarmed. The wings are large, having no rudimental first quill, but the three first primaries are subequal, the third rather the longest, and the fourth is a little shorter than the first; they extend to three-fourths

of the length of the tail, which latter is rather short. Tarse short, but nearly equal to the middle toe with its claw: the toes formed for perching, the inner shorter than the outer toe; and claws rather short, moderately curved, and much compressed.

P. melanozantha, Hodgson. Length about four inches and a half, of wing two and seven-eighths, and tail an inch and a half; bill to frontal plumes five-sixteenths of an inch, and tarse half an inch. Upper-parts dusky-cinereous, tinged with dull olive-green on the head, and partially elsewhere; upper tail-coverts of the latter hue: lower parts paler, the throat white, passing down the centre of the fore-neck and breast; belly and lower tail coverts bright yellow; axillaries, and much of the inside of the wings, white; the outermost tail-feather has a large subterminal white spot on its inner web, and the next a similar but smaller spot: bill blackish, except the base of the lower mandible, which is yellow; and feet apparently have been greenish. Inhabits Nepál.

One or more of the following species will most probably be found to range in, or near, the present genus. 1, *Pipra squalida*, Burton, *P. Z. S.* 1836, p. 113; — 2, *Parisoma viroides*, Jerdon, vel *Fringilla agilis* of Tickell's list, which I expect to receive in a few days; and 3, *Pardalotus pipra* of Lesson's *Manuel*, from the Himalaya, the description of which I have not seen, and which may prove identical either with *Pipra squalida*, which also is from the Himalaya, or with Mr. Hodgson's bird here described.*

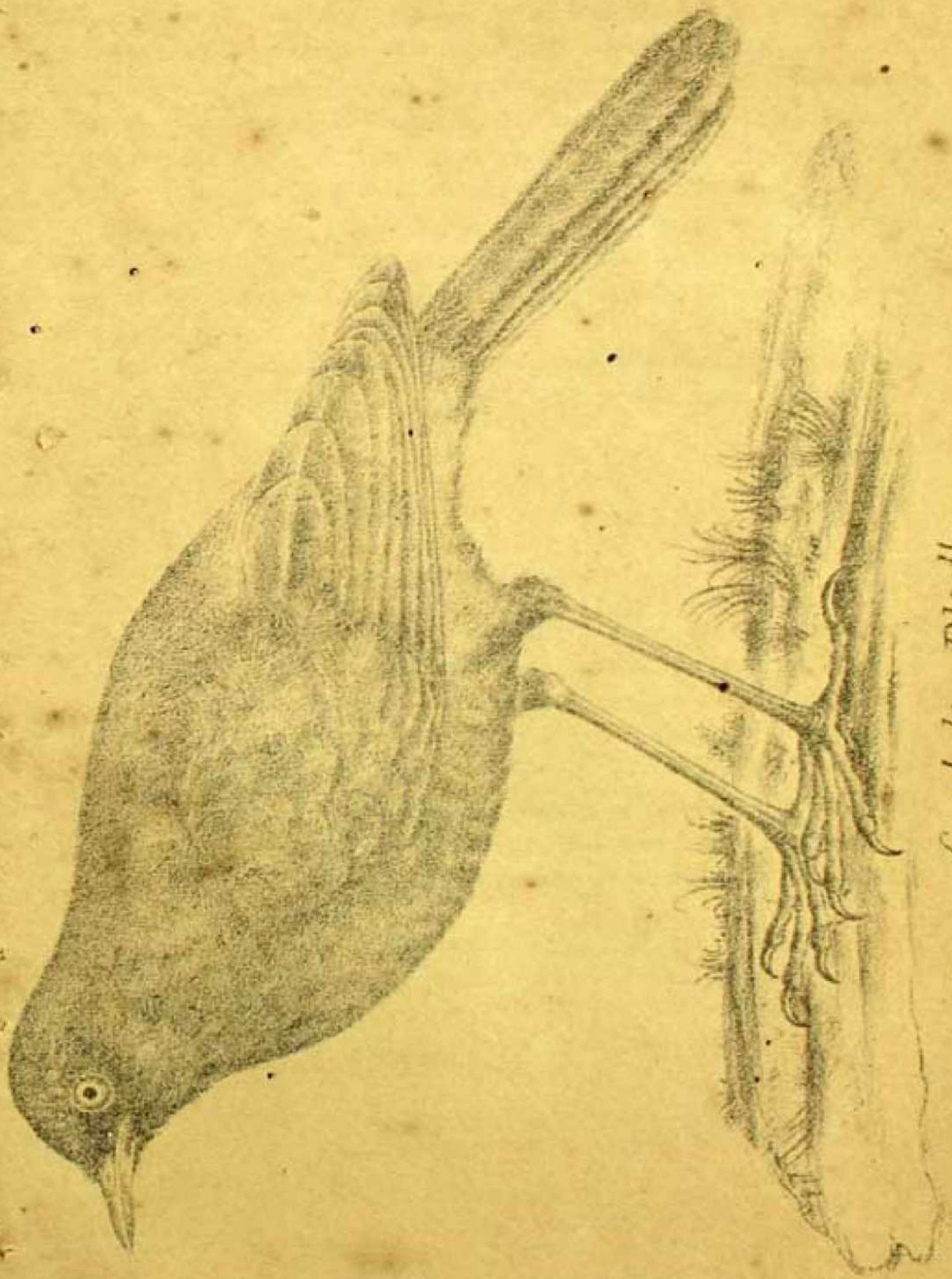
Among other interesting species forwarded in the present collection from Arracan, I may just notice *Semnopithecus obscurus* of Reid, which is known to be common in the vicinity of Singapore, and should therefore be the Tenasserim *S. maurus* of Helfer; — *Tupaia Javanica*,† fine specimens (the genus *Gymnura* having been previously met with in the same province); — the *Picus canente*, Lesson, which

* Upon consideration, the hard-billed *Dicaeum* group, comprising *Myzanthæ* and *Pachyglossa* (?), appears very distinct from the soft-billed *Nectarinia* group, comprehending *Arachnothera* and *Anthreptes*, which latter subgenus might, I think, be very properly abandoned, as founded on insufficient characters.

† Mr. Hodgson, to whom I exhibited a specimen of this animal, had never met with the genus in Nepál, nor was it known to his experienced shikaree, to whom I also shewed it; but Capt. Tickell assures me, that he distinctly recognises the genus as inhabiting Central India!



Indigobird xanthonotus, Blyth;



Cinclidium frontale, Blyth.
Natural size.

ranges, with *P. cordatus*, Jerdon, (a species which the Society has received from Tenasserim as well as from Southern India), and with the Malayan *P. concretus*, Tem., in the subgenus *Hemicircus*, Swainson; — a new Partridge (*P. Phayrei*, Nobis), closely resembling in plumage the Pintado Partridge of the Mauritius (*Francolinus perlatus*), but of a less robust form, and the male armed with well developed spurs, — two fine new Herons, one of them, however, perhaps the *Ardea ardesiaca* of Wagler, &c. In previous collections, Capt. Phayre has also enriched the Society's museum with a new *Manis*, and various other interesting species.

Plates. I annex figures of *Indicator xanthonotus*, *Xiphorhamphus superciliaris*, *Paradoxornis ruficeps* (vide p. 947, ante), and *Cinclidium frontale*.

Note on the Flata limbata, p. 898 et seq., ante.

In a recent communication to Mr. Blyth, Capt. Hutton remarks, of this insect, that—"This year has shewn me that I committed an error in saying that the larvæ come forth in December or January,—as I have now found them in crowds so early as the *middle of November*, and, from their size and the quantity of wax then deposited, they must have been hatched so early as the *beginning of October*. The so-called wax, is apparently a species of manna, and it certainly has much the taste of it. I want to ascertain, therefore, if it might not be useful in medicine."

In p. 898, l. 20, for "image," read *imago*.—E. B.

Proceedings of the Asiatic Society.

Wednesday Evening, 13th November, 1843.

The usual Monthly Meeting was held on Wednesday evening, the 13th November. The Honorable the President in the chair.

The Bust of Mr. James Prinsep, by Chantry, (finished by Mr. Weekes,) having arrived on the *Essex*, was exhibited, and both as a work of art and a most faithful and spirited likeness, it excited the highest admiration.

R. Ganthony, Esq. was balloted for, and declared duly elected.

The following new Members were proposed by the Secretary, and seconded by the Sub-Secretary.

Lieut. Hickey, 1st B. N. I., and Willis Earle, Esq.

Rev. J. Long, was proposed as an Associate Member by the Honorable the President, and seconded by the Secretary.

The following list of Books, presented and purchased, was read:—

Books received for the Meeting of the Asiatic Society, on the 1st November, 1843.

The Calcutta Literary Gleaner, October 1843, vol. ii, No. 8.—Presented by the Editor.

The Monthly Journal of the Agricultural and Horticultural Society of India, vol. i, and vol. ii, to No. 8.—Presented by the Society.

The Oriental Christian Spectator. Bombay. September and October 1843, 2nd series, vol. iv, Nos. 9 and 10.—Presented by the Editor.

Proceedings of the Academy of Natural Sciences of Philadelphia, March and April 1843, vol. i, Nos. 24 and 25.

The Journal of the Royal Geographical Society of London, 1842, vol. xii, pt. ii.

The Annals and Magazine of Natural History. London, August and September 1843, vol. xii, Nos. 75 and 76.

Quarterly Journal of Meteorology and Physical Science, Edited by J. W. G. Gutch. London, April 1843, vol. i, No. 6.—Presented by the Editor.

Proceedings of the London Electrical Society, Session 1842-3, vol. i, pts. vii and viii.—Presented by the Society.

The Edinburgh New Philosophical Journal, by Professor Jameson, April 1843, vol. xxxiv, No. 68.—Presented by the Author.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, 3d series. London, 1843, vol. xxii, Nos. 145 and 146.

Transactions of the Geological Society of London, 2d series. London, 1842, vol. vi, pt. ii.—Presented by the Geological Society.

Journal Asiatique, ou Recueil de Mémoires, 4me. series. Paris, Janvier et Février 1843, tome i, Nos. 1 and 2.

Journal des Savans. Paris, Février et Mars, 1843.

Delessert, Souvenirs d'un Voyage dans L'Inde, exécuté de 1834 à 1839. Paris, 1843.—Presented by the Author.

Batten's Report on the Settlement of the District of Gurhwal, in the province of Kumaon. Agra, 1843.

Leach's Zoological Miscellany. London, 1814-1817, 8vo. 3 vols.—Purchased.

Gray's List of the Genera of Birds. London, 1841.—Ditto.

Gray's Spicilegia Zoologica, pt. i.—Ditto.

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the month of September 1843.—From Government.

The Grāhlāghava, a Treatise on Astronomy, with a Commentary, by Mallārī. Edited by L. Wilkinson. Calcutta, 1843. (Sanskrit.)—Presented by the Rev. J. J. Moore, Secretary Agra School Book Society.

The Gunitadhia, or a Treatise on Astronomy, with a Commentary entitled the Mitacshara, forming the 3d portion of the Siddhanta Shiromuni, by Bhashkara Acharya. Edited by L. Wilkinson. Calcutta, 1842, (Sanskrit.)—Ditto.

The Goladhia: a Treatise on Astronomy, with a Commentary, entitled the Mitacshara, forming the fourth and last Chapter of the Siddhanta Shiromuni, by Bhaskara Acharya. Edited by L. Wilkinson. Calcutta, 1842. (Sanskrit.)—Ditto.

Saadi, Auteur des Premières Poésies Hindoustani, par M. G. de Tassy. Paris, 1843.—Presented by the Author.

Bibliothèque de M. Le Baron S. de Sacy, 1 liv. Paris, 1842.—Presented by R. Merlin, Esq.

The Vendidad Sādē, by the late Frāmjī Aspandiarjī and other Dasturs. (Zend). 1842, 8vo. 2 vols.—Presented by the Bombay Branch Royal Asiatic Society.

Chart of the Comparative Readings of Eight Barometers, 1843.—Presented by Mr. Buist, in charge Bombay Observatory.

A Petition from the Widow of the late Mr. Bouchez, was presented. Referred to the Committee of Papers for report in the first instance.

The following Memorandum by the Secretary was read :—

Memorandum by the Secretary.

I have, with much regret, to report the death of the aged, and highly respected Pundit Kamalakanta Vidhyalanka, the friend and fellow labourer of James Prinsep. With him has expired the accurate knowledge of the ancient Pali and Sanscrit forms of writing; for although we now possess a key to these ancient characters, no Pundit has exercised himself in the act of decyphering to the extent to which has Kamalakanta. Like all learned persons of his class, he carefully avoided the communication of his peculiar knowledge, and latterly, having as he thought little chance of being contradicted, the old man became exceedingly dogmatical and opiniative. As I was totally destitute of that critical ingenuity and wonderful acumen which supplied in our lamented friend, James Prinsep, the want of philological accuracy, and as I had not command of the time which he could devote to the careful and patient investigation of the readings of ancient inscriptions, I soon abandoned the attempt to avail myself of Kamalakanta's services in this department. His appointment about the Society was that of Sanscrit Librarian.

He has left two wives, a married and one unmarried daughter, and a son now being educated at the Sanscrit College. His only other relative is a nephew, who has been latterly doing the old man's duties in the Library. He is an intelligent and active person, and is quite competent to conduct the duties of Sanscrit Librarian. I do not know the degree of his proficiency in Sanscrit, but he seems capable of answering all references respecting books made by parties who attend the Library. The librarian's Salary is Rs. 30 a month. I would for efficiency's sake have recommended our securing the services of a young Pundit, named Sarodha Purshād, who also assisted James Prinsep, and has been of much help to me. He is a man of real ability and learning; but as I can always command his services, (he being employed in my office); as Dr. Roer's proficiency in Sanscrit is now acknowledged; and as the Society owes a debt of gratitude to Kamalakanta, and of respect to him as the collaborator of James Prinsep, I would propose to offer his nephew 20 Rs. a month as Librarian, reserving the other ten for a purpose I shall have in a short time the honour of subjecting to consideration.

I have also to report the demise of Mr. M. Bouchez, our head Taxidermist; regarding this appointment, I shall have the honour of reporting hereafter. I am now with Messrs. Piddington and Blyth engaged in arranging for a proper successor to the duty.

H. TORRENS,

October 11, 1843.

V. P. and Sec. As. Soc.

The appointment of Rasmohun Nayvagish, the nephew of Kamalakanta Pundit, as Native Librarian and Pundit was duly sanctioned.

The following letter from Lady Rodd, accompanying a beautiful Sévres Porcelain Medallion of Major Rennell, was read:—

To the Secretary of the Asiatic Society, Calcutta.

Lady Rodd presents her compliments to the Secretary of the Asiatic Society of Calcutta, and requests he will do her the favor to present to the Society in her name, the accompanying Medallion of her revered father, the late Major Rennell; her Ladyship had it executed at Sévres, during her late visit to Paris, by desire of the French Institute, and she feels anxious to send a copy to India, where Major Rennell's fame has ever been duly appreciated.

Wimpole Street, 17th August, 1843.

Read the following Letter to Government, in reference to the Volcanic Island off Cheduba, as ordered at the Meeting of October, with its reply:—

The Secretary to the Government of India, Home Department.

SIR,—By desire of the Hon'ble the President and Members of the Asiatic Society, I have the honor to request that you will be pleased to submit to Government their respectful request, that a scientific person qualified in all respects for the task be deputed at the public expence, and under the superintendence and directions of the Society, to examine and report upon the new Volcanic Island, which has appeared off False Island, near the S. E. end of Cheduba, and on the site of the valuable Copper Ore forwarded to the Society by Capt. D. Williams, from Flat Island, close to the same spot.

2. The reasons which, upon mature consideration, have induced the Society to submit to Government its opinion of the propriety of this measure, are briefly the following:—

I. The extreme interest with which phenomena of this kind are regarded by the learned in Europe, on account of their close connection with many questions both of speculative and even of practical science.

II. Their importance in a maritime point of view, as connected with the appearance and disappearance of shoals in many seas.

III. The occurrence of the phenomenon, so to say, at our own doors; whence it would be hardly creditable to the British name, were not the fullest investigation of it to take place, and be given to the world. It is barely necessary to allude to the high approbation which will on the other hand be accorded to the Government of India, if this is fully, efficiently, and creditably done, so as to satisfy the just expectations of the scientific world in Europe.

IV. Many other scientific, geological, and even national considerations might be adduced here, which the Society doubts not will readily suggest themselves upon mature consideration; but passing over these, it would farther advert to the financial and commercial interest attached to the discovery of a rich ore of Copper in this hitherto unknown locality, when its proximity to the mountains of the Aeng Pass, and other considerations are borne in mind; and (though fully aware that such views and the hopes derived from them are often fallacious,) it is evident that these are neither few nor unimportant.

V. The Society would moreover respectfully submit, that in the establishment of a Museum, (that of Economic Geology,) for the express purpose of aiding in every way the developement of the mineral resources of India, the Honorable the Court of Directors would almost seem to have anticipated that cases like the present would arise, and to have virtually expressed its desire that no such opening for the advancement of general knowledge, or the possible advantage of the state should be left unexplored: and this the more especially, when it occurs so near to the metropolis.

VI. The Society feels that the institution of the Museum of Economic Geology entrusted to their charge, under the immediate Superintendence of an Officer under their orders, but whose salary is at the public charge, entitles the Government to identify itself, when occasion offers, with those who voluntarily seek in these times the general advancement of science, and the benefit of India; and the Society would therefore, from a feeling of duty, abstain from any other course than that of informing the Supreme authority, that an opportunity existed for the practical exercise of means tending to elucidate questions of much interest and importance.

3. Impressed with these considerations, and with many more which the Society will not for brevity's sake, or cannot from its position, intrude upon the attention of Government, it has carefully made such preliminary enquiry as might obviate loss of time should the present recommendation be adopted; and the results of these is, that the services of Mr. Stephen Mornay, a gentleman who has received a regular scientific, geognostical, and practical Mining education, who holds a diploma from the Royal Mining College of Saxony, with other credentials of the most satisfactory kind, and who is also well known in Calcutta as a person of an enterprising, persevering, and energetic character, are available on a salary of Co's. Rs. 400 per mensem for whole months, or 150 Co's. Rs. per week for broken periods, and 3 Rs. per diem for his tra-



velling expences when not furnished with a conveyance by Government, by which also all contingent charges, such as the costs of surveying, those of examining mineral sites, or such as might perhaps prove to be such, collecting and conveying specimens, &c. &c. are to be defrayed. The Society would also solicit permission for an indent on the Magazine and Surveyor General's Office, for tools and scientific instruments, &c. under its inspection, and responsibility for their safe custody and due return. Mr. Mornay's time to be at the disposal of Government under the Society's directions, for any period long or short, as may be found necessary.

It presumes that this will not be thought more than a fair remuneration for the services of a gentleman of scientific attainments on a duty which must involve much personal labour and some discomfort, and which demands acquirements not commonly to be met with in India.

4. In conclusion, the Society would earnestly and respectfully urge upon the attention of Government, that opportunities combining as this does the augmentation of general knowledge and the chances of immediate benefit, and both in the same locality, but rarely indeed occur; and it is thus the more anxious that this investigation which it trusts cannot fail to redound to the credit of its promoters, should not be neglected.

H. TORRENS,

11th October, 1843.

Vice President and Secretary Asiatic Society.

No. 298.

From T. R. DAVIDSON, Esq. Officiating Secretary to the Government of India, to H. TORRENS, Esq. Vice President and Secretary to the Asiatic Society, dated the 21st October, 1843.

Home Department.

SIR,—I am directed to acknowledge the receipt of your letter, dated the 11th instant, written by desire of the President and Members of the Asiatic Society, requesting that a scientific person may be sent at the public expense to examine a Volcanic Island, which is stated to have appeared off False Island near the S. E. end of Cheduba, and explaining the reasons which have induced the Society to make this request.

2nd. The Governor General in Council considers, that there should be a Nautical Survey in the first instance of this Island; its locality and extent should be accurately ascertained, before its internal formation and character are scientifically examined.

3rd. His Lordship in Council will request the Hon'ble the Deputy Governor of Bengal to authorize an arrangement by which a Nautical Survey may be effected, and when that object has been attained, and the result reported, the adoption of further measures, with a view to the promotion of Science, will be taken into consideration.

I have the honor to be, Sir,

Your obedient servant,

Council Chamber, the 21st October, 1843.

T. R. DAVIDSON,

Offg. Secy. to the Govt. of India.

And the following from Captain Williams was also read:—

No. 1898.

Letter of Assistant Commissioner Capt. D. Williams, of 9th August 1843, with report of the native Soogree, (officer,) accompanying it.



MY DEAR SIR,—The Soogree of Flat Island has at last been able to come to the Sudder station. He reports to me the sudden disappearance of the Island thrown up by a volcano, a few days after its appearance. It was impossible to go to it to obtain any of its formation. This is much to be regretted, as I see by your letter of the 7th instant, just received, that you attach importance to the subject of the volcano.

I am encouraged by your letter to submit specimens of cloth manufactured at this place; it so resembles the Scotch "Shepherd's Plaid," that I have had pantaloons made of it for wear. I should think it better adapted than the plaid, being not so warm for this country, yet warmer than jean or drill.

Dr. Andrews has sent specimens of this cloth for the inspection of Messrs. Ranken and Co. the tailors. It is made of double thread, and would be of a finer texture and stronger, if we had fresh English thread to make it with.

I also enclose for inspection a petrification of the *Bela* flower, (country Jessamine, or "*Jasminum Sambac*,") that the natives find here, though very seldom. The petrification occurs on the shrub. I had a much finer specimen that was stolen from me a few days ago; the natives set them in gold rings; this is evidently the bud of the flower, and is petrified when in the calix.

Yours faithfully,

Ramree, Arracan, 25th September, 1843.

D. WILLIAMS.

P. S.—I forwarded to you by Lieut. Phayre, who has left us for Calcutta, the lumps of iron that were found with the gold coins on Chedooba.

It was resolved, that as the Survey by the Ganges Steamer would not afford time for the researches contemplated by the Society, the Curator of the Geological and Mineralogical Department be requested to draw up such instructions, as may enable Captain Russell and his officers to collect usefully what information they can in the progress of their duties.

The Secretary presented specimens of the Type for the *Tarik-i-Nadiree*, of which work he stated he had so far advanced the labour of collation, that the printing of it might now commence.

Read the following Letter from Secretary to the Government of India:—

No. 40, of 1843.

From J. THOMASON, Esq. Secretary to the Government of India, to the Secretary to the Asiatic Society, dated Fort William, the 30th September, 1843.

Foreign Dept. Secret.

SIR,—At the desire of the Governor General in Council, I have the honor to transmit to you for the use of the Asiatic Society, and for such notice in the Journal of its proceedings as may be considered necessary, the accompanying copy of Notes of a Tour taken through parts of Beloochistan in 1838-39, by Hajee Abdool Nabee, translated and arranged by Major Robert Leech, C. B. Bombay Engineers.

I have the honor to be, Sir,

Your most obedient servant,

Fort William, the 30th Sept. 1843.

J. THOMASON,

Secy. to the Govt. of India.



Also the following from the Secretary to the Government of Bengal:—

No. 2291.

From Under Secretary to the Government of Bengal, to the Secretary to the Asiatic Society, dated Fort William, 2nd October, 1843.

Marine.

SIR,—I am directed to transmit to you copies of the Meteorological Registers kept at Penang, for the months of April, May, June and July last. I am, Sir,

Your most obedient servant,

CECIL BEADON,

Under Secy. to the Govt. of Bengal.

The following Letter from Captain Jacob, Bombay Army, was read:—

MY DEAR SIR,—I perceive by a letter from Mr. Piddington to the Bombay Asiatic Society, published in its last No., that your Museum of Economic Geology is desirous of information as to ores, mines, &c. on our side of India; I enclose therefore a report on the iron of the Guzerat Peninsula, published I believe by the Committee of the London Society, which devotes itself to inquiry into and improvement of our Indian resources, to whom it was sent from Bombay, but what became of the specimens that accompanied it, given to our Bombay Geological Society, I know not; if these are desiderates, I can easily supply a fresh collection on my return.

From my long silence, I fear you will have thought me very ungrateful for your Journal duly received. Last month I sent you a budget on the Girnar Inscriptions, which I trust has reached; intense official occupation, (in Kattywar we have two men to look after twenty-two thousand square miles,) and severe illness, have stood in the way of my usefulness; the first cause has ceased, but the other remains.

Yours, my dear Sir, very truly,

Ootacamund, 11th November, 1843.

E. JACOBS.

Read the following from Captain Hannington, Purulia, addressed to the Sub-Secretary.

MY DEAR SIR,—I am extremely obliged to you for the trouble you have taken about the Mortality Table, and also for the perusal of Major Henderson's valuable Paper, which I return by this day's post.

If you can procure, and will publish, Mr. Prinsep's Table, the purpose for which I wanted it will be fully served.

I send you a Memorandum, which I have drawn up respecting Mortality among the Military. There are a few Tables to which I have prefixed a few explanatory remarks. I have abstained from any *practical* deductions, as they would hardly fall in with the scientific nature of your Journal, in which perhaps you may think fit to publish them. Should the Paper as it is, be thought unsuitable, you may reject it without ceremony.

I am, my dear Sir,

Purulia, October 5, 1843.

Yours very truly,

J. HANNINGTON.

Captain Hannington's very valuable Tables will be printed in the Journal, and in an early number.

Read the following Letter from our new and zealous associate Dr. Sprenger :—

To the Secretary of the Asiatic Society of Bengal.

DEAR SIR,—The Asiatic Society is in possession of two copies of Abdur-Razzak's Dictionary of Suffitic terms, which being rather scarce, and the completest work of the kind, might deserve to be published; and if the Society should deem it worthy of being edited, I should with great pleasure undertake the task. I am fully aware of the objections which can be raised against the work. Sufism is not much studied, neither here nor in any other part of India, and the merit of the work is perhaps not so great as it might be expected. With reference to the first objection we may answer, that it is a duty for us, as we are nearer the source, to furnish European scholars who have done so much for India, with materials: and Tholuck's work *De Sufismo*; Garcin de Tassy's most elegant book, entitled *Les Oiseaux et les Heures*, "Gehmölder's" *Specimen de Philosophia Arabum*, Rosenzweig's magnificent edition of part of "*Jelâled-din Rum*," and Ruckert's highly poetical version of other portions of the *Mesnewi*, are not only proofs that Sufism is studied in Europe, but that they find very great difficulties in explaining technical expressions, most of which they might find without loss of time in Abdur-Razzak's Dictionary. As to the merit of the work, I may repeat what I have already stated: a Dictionary of Suffitic terms is very desirable, and this is the best book known on the subject, it is therefore the more desirable that it should be edited, as no European collection of MSS. is, to my knowledge, in possession of a similar work.

The work itself is very small, and would hardly fill one hundred pages, if the Arabic text alone was printed, which I should think best to do. The expense would therefore be very trifling.

I am, dear Sir,

Your's most respectfully,

A. SPRENGER.

The work upon this recommendation was ordered to be printed forthwith under Dr. Sprenger's kind superintendence, and the best thanks of the Society were accorded to him for his suggestion.

Calcutta, 1st November, 1843.

Read a letter from Mr. J. T. D. Cameron, accompanying the Model to which it refers.

To H. TORRENS, Esq. Secretary to the Asiatic Society, Calcutta.

SIR,—I have the honor to forward per bearer, a specimen of the Ferry Boats commonly used in Ceylon.

The European residents of the Island call them Out-riggers, from the outer work attached to the boat, which is intended to balance it. The craft used by the native fishermen are much larger, but similarly built.

Should you think the specimen deserving of a place in the Museum of this city, I beg to say it is entirely at your service. I am, Sir, yours obediently,

La Martiniere, 24th October, 1843.

J. T. D. CAMERON.

From the Rev. J. J. Moore, Secretary Agra School-Book Society.

No. 114.

To the Secretary of the Asiatic Society, Calcutta.

SIR,—I beg to present, for the acceptance of the Society, copies of two celebrated Sanscrit works on Astronomy, published under the patronage of the Agra School Book



Society; and since the death of the late Resident of Sehoré, completed under my supervision.

I have the honor to be, Sir,

Your most obedient servant,

Agra, 12th October, 1843.

J. J. MOORE,

Secy. Agra School Book Society.

The type and general execution of these Books were considered as most creditable to the Agra School-Book Society's Press and to the Editors.

Read the following letters from the Bombay Branch Asiatic Society:—

To the Secretary of the Asiatic Society of Bengal, Calcutta.

SIR,—Under the instructions of the Bombay Branch of the Royal Asiatic Society, I have transmitted for the Library of the Asiatic Society of Bengal, by Capt. Noakes of the Ship *Samuel Boddington*, a lithographed copy, in 2 vols. of the Vendidad, in the Zend language, but Gujarathi character, with a Gujarathi translation, paraphrase, and comment, by Aspandiarji Framji and other learned Dastúrs of the Kadmi sect of Parsees. Of this work the Society has had 25 copies lithographed at an expense of upwards of Rupees 1,000, with the object of preserving a work now become rare in manuscript, and of distributing it amongst the principal libraries of Europe and Asia. I shall be happy to receive an acknowledgment of the receipt of the work. The Society have also directed the Jzashné and Vispárád, which compose the doctrinal standards of the Parsi faith, and the larger liturgy in use among the Zoroastrians, to be printed, which will be forwarded as soon as ready.

The MSS. from which these works are copied, are in possession of the Rev. Dr. John Wilson, late President and present Honorary President of the Society.

I have honor to be, Sir,

Your most obedient servant,

Bombay Asiatic Society's Rooms, 7th Sept. 1843.

JOHN G. MALCOLMSON,

Secretary B. B. R. A. S.

To H. TORRENS, Esq. Secretary to the Asiatic Society of Bengal.

SIR,—I am directed by the Bombay Branch Royal Asiatic Society, to request that you will have the goodness to order the following works to be sent to Messrs. Thacker and Co., for transmission to the Library of our Bombay Society, along with some works ordered from them. I have requested Messrs. Thacker and Co. to pay yourself, or the Treasurer of the Asiatic Society, the price of these works, as advertised on the cover of the Journal of your Society.

The Mahabharata in Sanscrit, 4 vols. (large paper.)

Harriwansa, (royal 4to.)

Raja Tarangini, (large paper.)

Naishadha, (4to.)

Raghavansa.

I have the honor to be, Sir,

Your most obedient servant,

Bombay Asiatic Society's Rooms,

6th September, 1843.

JOHN G. MALCOLMSON,

Bombay B. B. R. A. S.

The present of the rare work alluded in the first letter was duly appreciated by the Members, and in reference to the order contained in the last letter, the Secretary stated, that he had taken upon himself, pending the approbation of the Society, to present to the B. B. A. S. the works desired by them, which was fully approved of.



Read the following Letter from Moulmein :—

H. TORRENS, Esq. *Secretary to the Asiatic Society.*

SIR,—I am desired by the Committee to apprise you of the formation of an Horticultural and Agricultural Society at this station, connected with which will be a Museum of the Natural History of these provinces, so soon as the funds of the Society will admit of the erection of a building for the reception of specimens; in the meantime, they are anxious, as a commencement, to open a correspondence with your Society, and trust it will be reciprocated. I have the honor to be, Sir,

Yours very obediently,

Moulmain, 12th October, 1843.

G. R. GORDON,

Hony. Secy.

The Secretary was requested to state that the Society would have much pleasure in forwarding the views of that at Moulmein in every possible way.

Read Letter from the Hon'ble Company's Astronomer at Madras.

From T. G. TAYLOR, Esq. F. R. S. and F. R. A. S. *Hon'ble Company's Astronomer,*
to H. TORRENS, Esq. *Secretary to the Asiatic Society.*

SIR,—With reference to an application lately made by your Society to the Governor General of India to be supplied with the Meteorological Observations made at the Madras Observatory, at the Tidal Stations, and at the Magnetic Observatories, I am desired by the Most Noble the Governor in Council at this Presidency, to place myself in communication with you upon this subject, and to furnish the Asiatic Society with whatever observations you may desire; to this end I have the honor to state,

1st. That the Meteorological Observations made at the Madras Observatory, from their commencement in 1795 up to the end of 1822, are printed in a work entitled "Madras Observatory Papers," copy of which it appears has been furnished to the Asiatic Society.

2d. The Meteorological Observations made at this Observatory since 1822, and up to the end of the present year, are now in the course of publication, and a copy will be forwarded to the Asiatic Society on its completion.

3d. The Meteorological Observations at the Magnetic Observatories being made at odd hours and minutes of Göttingen mean time, and bearing reference to certain corrections which may be necessary to the Magnetic Observations, rather than to any Meteorological enquiry, are not as a whole of that strict character, to entitle them to the name of a Meteorological Register; selections from these, however, with certain explanations and corrections, will eventually be published.

4th. With regard to the Meteorological Observations made at the Tidal Stations, it is proposed that their publication shall be undertaken as soon as two complete years' Observations at each station has been obtained, when the Observations will altogether be discontinued.

5th. Since the whole of the Meteorological Observations asked for by your Society will in all probability be in print in the course of a twelve month, I have delayed for the present forwarding any manuscript copy; in case however any more immediate information should be desired, I shall be prepared without delay to forward your wishes.

I have the honor to be, Sir,

Your most obedient servant,

T. G. TAYLOR,

Madras Observatory, 26th September, 1843.

Hon'ble Company's Astronomer.

Read Letter from Colonel Spiers, Resident at Gwalior, &c. &c.

To H. PIDDINGTON, Esq. Sub-Secretary to the Asiatic Society, Calcutta.

DEAR SIR,—When on furlough, I picked up a few geological specimens of various kinds, chiefly limestone from Stirlingshire, Scotland, a few specimens of copper ore from Ireland, and lead from Lanarkshire, with some of various kinds, probably not marked, at least not to be trusted; in all perhaps 50 specimens. If you think they would be of any use in the Museum of Geology, I shall be happy to send them down by some boat. I happen also to have 5 or 6 coins, one of Sigismund III, one James VI, one Clot 1602, 1 ditto 1582, one Hamburgh, and one ditto James 1570. If you think these would be valued, I will be happy to send them also.

Your obedient servant,

Cawnpore, 23d September, 1843.

A. SPIERS.

Read the following Letter to the Secretary from Captain Eastwick:—

To the Secretary of the Asiatic Society of Bengal, Calcutta.

MY DEAR SIR,—I received a day or two ago, your kind note regarding the publication of my Sindo Vocabulary, and am much gratified by the flattering manner in which my endeavours have been mentioned. I returned to England in June, on sick certificate. With respect to the 25 copies of the Vocabulary reserved for me, I should be highly obliged, if you would order them to be transmitted to Messrs. Forbes and Co. of Bombay, who are my Agents in India, and who will take care of them for me.

I am, dear Sir,

Yours truly,

Frankfort sur Maine, August 17, 1843.

E. B. EASTWICK.

The Secretary stated, that Captain Eastwick's copies had been sent to Bombay through the Government, but that Messrs. Forbes would be written to, in order that they might claim the packet if not already delivered to them.

Read the following Note from Dewan Ramcomul Sen, who had kindly undertaken to examine the Sanscrit paper on Eclipses, presented at a former meeting of by the Rev. J. Pratt:—

The bad state of my health has hitherto prevented my writing to you about the accompanying paper, which I have now the pleasure to return. It is styled "Grahano Mala," or Garland of Eclipses, and has been prepared I believe by some Astronomer of Nepaul. It professes to give an account of Sun and Moon Eclipses for six years; viz. from the year 1759 to 1766 of the Sak era. It does not, however, shew any calculation or data by which the problems are solved. Following is a Table of the Eclipses:—

| | |
|------------------------------|------------------|
| Sak, 1759, (or Sumbul 1894,) | —1 Moon Eclipse. |
| 1760, | 1 Ditto ditto. |
| " | 1 Ditto ditto. |
| 1761, | 1 Ditto ditto. |
| " | 1 Sun ditto. |
| 1763, | 1 Moon ditto. |
| 1764, | 1 Sun ditto. |
| 1765, | 1 Ditto ditto. |
| " | 1 Moon ditto. |
| 1766, | 1 Ditto ditto. |
| " | 1 Ditto ditto. |



Year, month, age of the Moon, the day of the week, the hour it began, the position occupied, and its duration, are stated.

29th October, 1843.

The paper was not considered as worth printing, as being for so very short a period, and the number of cuts considerable.

Read the following Letter from Major Hough, accompanying the Life Preserver to which it refers:—

To H. TORRENS, Esq. *Secretary to the Asiatic Society of Bengal.*

SIR,—I do myself the honor to transmit, for submission to the Asiatic Society of Bengal, a "Cloth Life Preserver," which is so portable and cheap, as to render it very useful to all individuals, whether on board of Ship, or on board of Boats in any river.

I have the honor to be, Sir,

Your obedient servant,

Calcutta, 24th Oct. 1843.

W. HOUGH, Major.

P. S.—A description of the "Life Preserver" is annexed to this letter:—

Description of the "Cloth Life Preserver."

It is made like a Jacket without sleeves, composed of two pieces of cloth sewn together, so as to form the front and back. There being two cloths to each, the space between the two is easily inflated by means of the wooden tube placed in the front, by blowing into it. It can only be inflated when the cloth is wet. The tapes, above and below, which pass through the loops, are meant to fasten the Life Preserver round the neck and waist. When inflated, it will float any man—for, in proportion to the bulk of a man's body, must the size of the Life Preserver be increased. It is in use in the British Army at Home, and its cost is about one shilling. A cork, or piece of wood, and a piece of string, or tape, should be attached to the tube, as a stopper; to prevent the egress of air, or of the ingress of water.

The Americans have rendered all kinds of furniture "Life Preservers" on board of Steamers; but, I do not find any so personally useful as that I submit, since the user can swim with it to land, &c. It is also available to travellers generally, having to cross rivers, &c., being portable. It is superior to the "Chinese Bamboo Life Preserver," and is better and cheaper than the "Air-tight Hats and Caps," which cost 16 to 14 Rs. and are too costly for the Private Soldier, or those in the lower ranks of the people. It can be renewed, at pleasure, while there may be difficulty in procuring an adequate supply of Hats and Caps; and even Bamboos may not always be procurable. The "Cloth Life Preserver" is admirably adapted for "Regimental Swimming Parades;" and may, annually, save the lives of many men, women, and children, both European and Native.

Read the following Letter accompanying the valuable paper to which it refers:—

H. TORRENS, Esq. *Secretary to the Asiatic Society.*

MY DEAR SIR,—I have the pleasure to send you a sketch of Aracanese History. You will be able to judge whether it is of sufficient interest to lay before the Society, a point which from my Aracan bias I feel uncertain about.

Yours very truly,

A. P. PHAYRE.

This most interesting communication was handed to the Editors, for early insertion in the Journal.

The Secretary also presented on the part of the Rev. J. Long, who was present, a valuable Essay, entitled "Tables of Comparative Philology, shewing specimens of the affinity of the Greek, Latin, and English with the Sanskrit, Persian, Russian, Gaelic, Welsh, Lithuanian, German, Hebrew, and Anglo-Saxon," which, as it was desirable to secure the Author's supervision, was also ordered for early publication, the subject being one of intense interest to Indian and general Philologists, and one that requires a rare combination of learning, talent, and industry, to undertake.

Read the following Letter from G. Buist, Esq. The Barometrical Chart to which it refers, was exhibited, and much admired :—

MY DEAR SIR,—A thousand thanks for your attention in forwarding me the Barometer Returns for the May Storm. I do not know that I shall have any more occasion to trouble you on this subject for the present, but should I require to do so, I shall avail myself of your kind offer of services.

I have this day shipped on board the *Samual Boddington*, three copies of a Diagram illustrative of the readings of nine Barometers, being up together for 24 hours, and read half hourly. One of these is for the Asiatic Society, the others for yourself, or any one else who may care about them. The Society's is the only one which is coloured, and put on a roller: the most simple operation of this sort is so expensively, so tardily, and so badly done at Bombay, that I have left them plain; so that should you think it worth while, they may be filled up to your fancy at Calcutta.

I am anxious to see your Memoir:—it is published I observe, but has not yet reached Bombay,

I forgot to mention, that a short Memoir, referring to the Barometric experiment, appears in the next number of the Bombay Asiatic Transactions, of which I shall send you a copy, so soon as it is printed.

Yours truly,

Bombay, September 6th, 1843.

GEORGE BUIST.

P. S.—In case the Maps should not be sent to you, perhaps you will take the trouble of sending for them to the office of Messrs. Gisborne and Co. on the *Samuel Boddington's* arrival.

Report of the Curator Museum Economic Geology for the month of October.

Museum Economic Geology.—We have to acknowledge in this month from the Bombay Branch Royal Asiatic Society, a box of Geological and Mineralogical Specimens, 35 in number, all of much interest and utility, and for the most part so far new to our Collections, that we only possessed small specimens of some of them. Another box has been announced by the Society. As the Catalogue is brief, it may be inserted here with the letter.

To the Secretary of the Asiatic Society of Bengal.

SIR,—With reference to my letter of the 5th ultimo, I have now the pleasure to enclose a list of the Geological and Mineralogical specimens forwarded for the Museum by the *Fazal Rubany*. These specimens are necessarily miscellaneous, as



they consist of duplicates put aside for your Society, in the course of the new arrangement, now in progress, of our Collection. Still some of them will, I think, be of interest, if not in the higher and scientific department of your Collection, at least in that of Economic Geology. The specimens of the Bombay Basalt, I request may be presented in my own name, and if more specimens of the Minerals they contain are required, I shall endeavour to procure them.

Another case will be dispatched in a few weeks. I have the honor to be, Sir,

Your most obedient servant,

Bombay Asiatic Society Rooms,

22nd Sept. 1843.

JOHN G. MALCOLMSON,

Secretary B. B. R. A. S.

List of Specimens forwarded.

- No. 1 to 6. Specimens of iron ore from Malwan, in the Collectorate of Rutnagherry. See Journal of the Bombay Branch Royal Asiatic Society, No. III, and Geological Transactions, Vol. V, page 548. The rock in which this fine ore is found, is stated to be sandstone, I think by mistake.
- 7 „ 9. Building stone from the ruins of Mandoo, the Ancient capital of Malwa. The fine reddish sandstone abounds with minute corals, and I have also found in it marine shells. Many of the finest buildings are composed of this.
- „ 10. Selenite. Persian Gulf?
- „ 11. Lithographic limestone (so called); southern Mahratta country. See Capt. Jervis' and Capt. Newbold's Papers in Journal of Asiatic Society of Bengal, Dr. T. Christie, in Edinburgh Journal of Science, and Geological Transactions, Vol. V, plate 46.
- „ 12. Argillaceous limestone. South Mahratta country.
- „ 13. Common ditto, (Kullajee,) ditto.
- „ 14. Calc spar in argillaceous limestone, ditto.
- „ 15. Limestone, ditto,
- 16 „ 17. Diamond sandstone, near Belgaum, ditto. It is not known that diamonds are found in this rock. It is so called from its relations and mineralogical characters being that of the diamond matrix.
- „ 18. Diamond sandstone. Kowlgere, Dharwar S. M. country,
- „ 19. Laterite, ditto.
- 20 „ 21. Gypsum from Persian Gulf. This was imported in some quantity intended to be used as stucco.
- 22 „ 25. Rock of which the Maldivé Islands are formed, collected by Capt. Moresby, I. N. See Darwin on Coral Reefs. The complete collection in the Bombay Museum is perhaps unequalled.
- „ 26. Iron stone from Segoor, 15 miles north of Dharwar, South Mahratta country.
- „ 27. Iron ore used at the native foundries, Mahableschwur hills.
- „ 28. Painted plaster of the baths of Aurungzeebe's palace, Aurungabad, by J. G. Malcolmson, Esq.
- 29 „ 30. Granite from bed of Nerbudda near Mhysur. See Major Stirling's letter, Bombay Geographical Society's Journal. This granite rises in the middle of the basalt, and is cut by basaltic dykes.



- No. to 31. Basalt, Mazagon Quarry, Bombay. Occurs in columns and balls. Is extensively used in the erection of the ship-building slips and wharfs in Bombay and Colabah. This specimen contains Laumonite and Prehnite. Presented by J. G. Malcolmson, Esq.
- „ 32. Ditto ditto, with Laumonite and Calcspar.
- 33 „ 34. Ditto ditto, with Apophyllite.
- „ 35. Basalt, from the hot springs of Rajapoor, Southern Concan. This specimen was coated with coating resembling Pyrites, probably from Hydro-Sulphureous water on the iron of the basalt.

JOHN G. MALCOLMSON,
Secretary, B. B. R. A. S.

Mr. Pyle of Futtegurh, to whom I addressed one of our circulars, sends us a box of specimens of a peculiarly interesting kind, being mostly the products of his own manufacture from materials near that station.

No. 76.

H. PIDDINGTON, Esq. Calcutta.

SIR,—I beg to apologize for not having answered your letter earlier. I have now the pleasure of sending the following products of Upper India by the hands of Mr. E. Fricker, who has engaged to deliver them over to you.

Pottery.—No. 1. A specimen of Earth, for making superior ware when mixed with

No. 2. Of which a specimen is also sent.

No. 3. Stone-ware Bottles made at Futtegurh, of the above Earth.

Crucibles.—The Earth marked No. 1, when properly manipulated is capable of forming Crucibles, which will withstand the most intense heat of a bellows furnace.

Fire Bricks.—No. 4. Fire Bricks made at Futtegurh.

No. 5. Soda Sub Carb. made at Futtegurh.

No. 6. The Earth from which the Soda is made.

No. 7. Dark green Glass from river sand and the above Soda, with certain additions.

No. 8. Light green Glass made from the above Soda, with certain additions.

No. 9. Citrate of Lime for the manufacture of Citric Acid.

Your obedient servant,

Futtegurh, 14th September, 1843.

JOHN E. PYLE.

Our indefatigable correspondent, Captain Shortrede, sends us a specimen of a supposed Lithographic Stone, of which his account is as follows:—

To H. PIDDINGTON, Esq. Curator Museum Economic Geology, Calcutta.

SIR,—I have the honor to inform you, that I have despatched to your address for the Museum of Economic Geology, by the Steamer *Luckia*, a package containing a slab of Stone from the neighbourhood of Kewa, which I apprehend may be found useful for Lithographic purposes.

I have sent two pieces; the smaller of which may serve as a hand specimen, and the larger for Lithographic experiment.

There are some quartz veins which probably may render this particular slab of no great value, but if the stone be otherwise fit for Lithography, it seems desirable to bring it to notice.



The locality from which this stone was brought is a hill at the small village Boorhwa, two miles S. E. from Raipoor, about twelve miles from Rewa on the road towards Mirzapoor.

On the top of the hill are the ruins of a temple of Devi, and a large pile of undressed stones, which seem as if they had been intended for the foundation of a flight of steps. They are laid without mortar, and the work has never been completed. The present slab was found lying loose at the bottom. The whole pile is of the same sort of stone, but a few slabs of sandstone have been used in building the temple. I did not ascertain the particular spot from which the pile has been quarried, but I believe it to be in the immediate neighbourhood, if not on the hill itself. This might easily enough be ascertained, should it appear that the enquiry would be worth the labor.

Some of these stones may be used as whetstones, and though not very good ones, they seem quite as good as many that are supplied from the public stores.

I have the honor to be, Sir,

Your most obedient servant,

Allahabad, 10th October, 1843. ROBERT SHORTREDE, Capt. 1st Asst. G. T. S.

Of these two stones, I regret to say, that the larger appears quite unfit for Lithography, being nothing more than a common fine grained (coarse grained for lithographic purposes) sandstone. The small slab was sent to Messrs. Black, as it promised better, and their answer is as follows:—

H. PIDDINGTON, Esq.

SIR,—I have pleasure in sending a few impressions, and the stone you sent me the other day; I have not troubled Mr. Bennett. The stone I find is rather too soft, and I fear will not give very clear impressions; but if a somewhat larger piece could be obtained, I would try how many fair proofs could possibly be taken from it.

Your obedient servant,

Asiatic Lithographic Press, 31st Oct. 1843.

T. BLACK.

Mr. Thomas Huxon, of the Salt Department, has presented a very beautiful lithographed section of the Boring of the Artesian Well of Grenelle near Paris, 1680 French feet deep, and I may mention here, that we fortunately possess a series of the Fort Borings to the depth of 172 feet.

Geological and Mineralogical Department.—Mr. Dodd, Assistant Assay Master, has obliged us with a few well chosen Geological specimens from the neighbourhood of Agra, of much interest in themselves, and of special utility to us in filling in our Cabinets of Comparative series.

From M. Gros of Bourbon, we have received a few specimens of Lavas, and Lava with Leucite, from the Volcano of that Island, which will be a valuable addition to our Volcanic series.

For all the foregoing Communications, the thanks of the Society were duly ordered.



Oriental Publications for Sale, at REDUCED prices, by the Asiatic Society.

| WORKS. | Rs. | Former Price. |
|---|---------|---------------|
| Mahābhārata, vol. 1st. pages 831, vol. 2d, pages 858, vol. 3rd, pages 859, vol. 4th, pages 1007, royal 4to. ... | 40 | 48 |
| Large paper do. do. ... | 50 | 61 |
| Index to the 4 vols. of the Mahabharat complete. ... | 6 | 0 |
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| Sansruta, 1st vol. 378 pages, 2d vol. 562 pages, 8vo. ... | 8 | 8 |
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*Memoir on Indian Earthquakes. By Lieut. R. BAIRD SMITH,
Bengal Engineers.*

*Part II.—Historical Summary of Indian Earthquakes, with some
Remarks on the general distribution of Subterranean Disturbing
Forces throughout India and its Frontier Countries.*

The following summary is offered, not as a perfect Register of the Earthquakes that have occurred in India and its adjoining countries during past times, but rather as a first step towards the formation of such a Register, which from its nature, must necessarily be a work requiring much time and much research. The requisite materials are scattered in detached notices throughout numerous works, to a limited number only of which, circumstances admit of my having access. I cannot therefore but feel conscious of the imperfections of this first effort to trace the history of Indian Earthquakes, and I would solicit the assistance of those who feel an interest in the subject, in so far as to furnish me with accounts of Earthquakes I may have omitted to notice, or with references to the sources whence such accounts are to be obtained. Materials thus furnished by the combined efforts of many would accumulate, and in process of time it might be hoped, that from them a complete historical summary of our Earthquakes may be prepared.

While as a matter of curiosity, it would be interesting to trace the occurrence of Earthquake shocks in this country, to the earliest practicable periods, I feel very doubtful whether the results obtained, would be of scientific importance sufficient to afford any adequate compensation for the time and labour that must be expended upon the work. Native authorities must be almost exclusively depended upon, and accounts of events of this class furnished by such authorities are invariably, in so far as I am yet acquainted with them, of a very unsatisfactory character: confined usually to a mere record of their occurrence, or if extending beyond this, to a detail, in exaggerated terms, of the destruction in life and property caused by them. It is not until European intelligence has been brought to bear upon the phenomena of Earthquakes in India, that the records become of scientific value, and it is to these records, (unfortunately much more limited than is desirable,) that any interest the following summary may be found to possess, is chiefly attributable. Imperfect, however, as notices of shocks by native authors certainly are, I am very anxious to procure as many of

them as possible, and any furnished me will be thankfully acknowledged.

Two methods of arrangement for the materials of this summary present themselves; first, the Earthquakes may be recorded in simple chronological order, without reference to any other circumstance than their succession in time: or second, neglecting their chronological order, they may be formed into groups according to the localities whence they have emanated. The latter appears to me, for several reasons, the preferable of the two: it is more methodical, it affords a species of natural arrangement for the shocks, and it indicates the general distribution of the forces to which the shocks are due. The Earthquakes herein described have therefore been arranged according to the localities from which they have proceeded, as indicated by the best information obtained.*

1. *Earthquakes of the Central Himalayan Tract.**

* The information relative to the occurrence of Earthquakes North of the Himalayas which I have been able to collect is so limited, that I have not thought it worthy of being included in the body of this Memoir. I am desirous, however, of placing it upon record, and I do so in the form of a note.

On the night of the 22nd January 1832, a destructive Earthquake occurred in the valley of the Oxus, extending thence across the Hindoo Khoosh to Moulton and Lahore. The late Sir A. Burnes thus alludes to its effect, in Buduckshan (*Travels in Bokhara, &c.* vol. III. p. 176,) "This country also suffered from an Earthquake in January 1832, which destroyed many villages, and a great part of the population. The roads in many parts of the country were blocked up by the falling of stones, and the river of Budukhshan was hemmed in for five days by a hill that tumbled in upon it. This great convulsion of nature occurred at midnight, and scarcely a family in the country but deplored the loss of some of its members. It was felt at Moulton and Lahore, but the centre of its violence appears to have been the valley of the Oxus."

The following extract of a letter from the same officer, dated Lahore, 23rd January 1832, published in the *Journal of the Asiatic Society*, vol. I. p. 34, gives an account of the shock as felt at that city, with some other interesting details connected with the Earthquakes of those parts of India generally:—

"As you will have perceived by the date of my letter, I have crossed the frontier, and am now at Lahore. An event occurred here last night, which I am sure will prove of interest to you—a severe shock of an Earthquake. There were two distinct vibrations, the last continuing for about ten seconds with alarming violence. It occurred eventually at 11 P. M. after we had retired to bed and were asleep. The door of my apartment and all the furniture were shaking with a rattling noise, when I awoke and ran into the open air. The house in which we are lodged is a most substantial dwelling of two stories, built of brick and chunam, being the garden house of M. Allard, and yet it was shaken most violently.

"I am informed by the Chevalier, that Earthquakes are of frequent occurrence in this city, especially in winter, but he does not remember so violent a vibration as that I have just mentioned. The shock was from East to West, or rather from South-east to North-west. The lofty minarets of this city afford however convincing proof, that there can have been no very violent commotion of nature within these 200 years. The Earthquakes of Cashmere are frequent, and the natives inform me, that the shocks are more severe nearer the mountains.

"I should mention that the atmosphere had indicated nothing unusual before the Earthquake, nor did the Barometer undergo any variation before or after it. The Thermometer stood at 37°; for the last ten days it has been 4° below the freezing point every morning at sun-rise, a much greater depression than I had expected in the Punjab, where it rose to 102° daily when I was here last July."

This Earthquake appears to have been felt throughout Yarkand, Kokan, and other parts of Chinese Tartary, as it is stated by W. H. Wathen, Esq. in a Memoir on Kokan, published in 1834, and founded on information furnished by Usbek pilgrims, that a few years previous, dreadful Earthquakes had devastated the whole of that territory. The following extract from a Memoir on Chinese Tartary, by the same gentleman,

Earthquakes of 1803.—This is the first Earthquake emanating from the central portion of the Himalaya range, of which any authentic information has been obtained. Its destructive effects were chiefly experienced in the mountain provinces of Sirmoor, Gurwhal and Kumaon, although its influence is said to have extended throughout the whole of the plains of Hindostan, from the Himalayas to Bengal.

The following details connected with it, are given in the "Gleanings of Science," vol. II, p. 50, by a writer, who though signing only his initials, may readily be identified with Colonel Hodgson, late Surveyor General of India, from whose accounts of his journeys in the Himalayas nearly all my information relative to this Earthquake has been obtained.

"I will in a general way notice among many other peculiarities of the mountains, some of the most remarkable. And first, of the Earthquakes which are more frequent in their occurrence, and more destructive in their effects than in the plains. You may have heard of the Earthquake of 1803, which was considered violent in this country, and many buildings were damaged over the whole extent from Bengal to the Punjaub: but in the mountains its effects were terrible, and a great part of the population perished; whole villages having been buried by the fall of cliffs, and sliding down of the faces of the hills. The scenes of that havoc have often been pointed out to me; the imagination can hardly form an idea of a more terrible event than such a catastrophe. What can be the reason of those more violent shocks in the mountains than in the plains? We saw no volcanoes, nor heard of any, and I believe there are none; thunder and lightning

(Journal Asiatic Society, vol. IV, p. 659,) indicates the volcanic nature of the localities under notice:—

"*Volcanoes—Sal-Ammoniac.*—At a distance of ten days journey from Aukú, (which lies North-east from Yarkand, about 20 days Caravan travelling,) are two very high ranges of mountains, between which there is a valley, the surface of which to a considerable depth, is covered with Sal-Ammoniac. There is a dreadful heat at this place, occasioned by a volcano which, by the people of the country, is called "God's Fire." The heat prevents them from approaching it in the summer; during the eruption the Sal-Ammoniac is said to be thrown out, and showered over the valley like mist, to the distance of one kos: it afterwards hardens, and becomes during the winter crystallised like ice. People go there at that season, cut it into convenient pieces, and carry it away. It is said that near old or Koneh Turfan also, is a mountain out of which flames of fire are seen to issue.

"*Earthquakes—Cholera.*—The natives state, that about three years ago (1832-33) there were constant Earthquakes in the province, and that Cholera committed great ravages at Yarkand. In Badakhshan, the Earthquakes destroyed a great number of houses and people."

Similar indications of volcanic action are continued throughout the territory of Iskardoh, where hot springs are numerous, the temperature of some of which is so high, that when a drop of the water is placed on the skin, it immediately raises a blister. (J. A. S. vol. IV, p. 594.)

Throughout the whole of Thibet copious hot springs occur, some of very high temperature, but I have not obtained any information relative to the occurrence of Earthquakes in that country. M. Alexander Csoma de Kőrös, in his Geographical notice of Thibet, (J. A. S. vol. I, p. 126,) mentions that between U and Ts'ang in Thibet Proper, there are hot springs used in curing cutaneous diseases and the gout. But such hot springs are numerous in the mountains lying East from the Ma-p'han Lake: especially at one place there is a hole out of which continually issues vapour, and at certain intervals, hot water is ejected with great noise, to the height of twelve feet.

are much less frequent in the upper mountains than in the plains, and I do not recollect any, except once on the way to Jumaotree, at a place near the bed of the river, and not more than 8,000 feet above the level of the sea."

Colonel Hodgson, in his *Survey of the Rivers Ganges and Jumna*, (*Asiatic Researches*, vol. XIV, p. 139,) under date the 13th of April, 1817, from Thanu to Catnaur, farther remarks:—

"After passing the worst part (of the route between the two above-mentioned places,) descended to Oj'ha Ghur, a hamlet of three huts only, at the foot of steep and lofty cliffs, the rocks hurled from which by the Earthquake of 1803, buried a small fort and village, which once stood here; dreadful mementous are seen in the mountains of that catastrophe. Under Oj'ha Ghur, a stream falls into the Jumna, and several cataracts are seen falling among the surrounding precipices. There are some hot springs at the bed of the Jumna, which is 400 feet below the hamlet. Latitude observed $30^{\circ} 54' 47''$."

The city of Sreenuggur, the capital of the mountain province of Gurhwal, suffered severely from the same shock. James Fraser, Esq. in his *Tour in the Himalayas* (p. 369,) thus alludes to the circumstance:—

"Sreenuggur, the chief town or capital of Gurhwal, is situated on the South bank of the Alacnanda, about twenty miles above its junction with the Bhagiruttee at Deopragur, where a strip of level ground stretches along for three or four miles, forming the valley known by the same name as the town. It was once comparatively populous and prosperous, forming as it did, not only the residence of the court, but a considerable entrepôt for the produce of the various countries in and on either side of the snowy mountains, which exchange commodities by the Nitteemānā and other Passes.

"When Colonel Hardwicke visited this place in 1796, it was perhaps not in its prime, but contained (as he computed) 700 or 800 houses and a good bazar. When Messrs. Webb and Raper, in 1808, passed through it on their way to Buddreenauth, it had sunk deeply in importance, and was to all appearance rapidly advancing to decay. It had not only to contend with the common enemies of the country, but also with natural causes no less ruinous. An Earthquake had occurred in 1803, which had done considerable injury: many houses were ruined, and the Rajah's palace was particularly shattered; and the encroachments of the river Alacnanda yearly destroy a portion of that which yet stands, threatening in time to sap the foundations of all."

Buddreenauth, the celebrated resort of Hindoo pilgrims, situated near the sources of the Alacnanda River, one of the tributaries of the Ganges, did not escape the destructive effects of the Earthquake of 1803. After describing the principal temple at this holy spot, Captains Webb and Raper continue thus:—

"The era of its foundation is too remote to have reached us, even by tradition; but it is considered the work of some superior being. This specimen of divine architecture, however, was too weak to resist the shock of the Earthquake, which left it in so tottering a condition,

that human efforts were judged expedient to preserve it from ruin : and the repairs which it has lately undergone, have completely modernised its external appearance. The body of it is constructed of large flat stones, over which is a coat of fine white plaster, which adds to the neatness, but has destroyed all outward pretensions to antiquity."

Several hot springs in the vicinity of this temple are then described. One is received in a large cistern, which is called the Tapta-cund, and forms a warm bath for the pilgrims, supplied by a hot spring issuing from the mountain through a subterraneous passage. The water of the Tapta-cund is as hot as a person can bear, and from it issues a thick smoke or steam, strongly tainted with a sulphureous smell. A little to the left of it, is Surya-cund, another hot spring, and besides these, are many more, all of which are turned to due account by the Brahmins of the Temple.

The large town of Barahal on the Bhagiruttee river, also a favourite resort for pilgrims, is the only other place in this neighbourhood which is specifically mentioned as having been injured by the Earthquake under notice. All its temples were more or less shattered, and many of its houses ruined, so that when visited by Mr. Fraser in 1815, it presented a miserable spectacle of dilapidation and filth. Before this catastrophe, it is said to have had fifty or sixty shops with a well frequented bazaar and numerous shrines and temples ; after it, a few mud huts with the ruin of former buildings alone remained. Whether since the period of Mr. Fraser's visit it has recovered any portion of its former prosperity I am not aware, but it is still largely frequented by pilgrims, and abounds in Bramins and Fakeers.

I have not been able to obtain any specific information relative to the ravages of the Earthquake in Kumaon, beyond the fact, that they were not less severe there than in Gurhwal, involving the destruction of life and property to a great extent.

The information obtained is not sufficiently precise to warrant any attempt being made to define the extreme limits of the shock of 1803, nor to trace it to any special spot as its focus of emanation. According to Captain Hodgson's statement, it injured buildings throughout the whole plains of Hindoostan, and if so, it must have been one of the severest shocks ever experienced in this country. Its fearfully increased intensity in the mountains, shews very distinctly that it was in them it had its source, and I have therefore had no hesitation in assigning it to the Central Himalayan tract. It can only however be thus referred in general terms, since to do more would require details much more minute and specific than, from the nature of the case, it is practicable to collect. This remark, I may here state, applies generally to the arrangements employed throughout this summary. The precise spots from which Earthquake waves diverge, have been fixed in some cases, particularly in Scotland, but to do this has required the employment of careful and constant observation, aided by registering instruments. The same effort cannot be made in India until the same materials have been collected, and all I have attempted is therefore

only to assign Earthquakes generally to those tracts from which, according to the best information procured, they seem to have proceeded.

Earthquake of 1809.—The only reference to this Earthquake which I have been able to find, is contained in the following Extract from a paper by H. Falconer, Esq. on the great Cataclysm of the Indus in 1841, (J. A. S. vol. X, p. 618). Having suggested the possibility of the bed of the river having been blocked up at a point high in its course, by mountain masses precipitated by an Earthquake, he adds, "An event of this sort is not improbable, for we know that in 1809, an Earthquake of such force took place in Gurhwal, that the Bishnoo-Gunga river, one of the great branches of the Ganges, was blocked up below Goseenauth by a landslip, and the water rose to 40 feet above its usual level." I had hoped to have been furnished by Dr. Falconer with a reference to the source whence this information was derived, but circumstances unfortunately arose which prevented his turning his attention to the subject, and I was accordingly disappointed in my hopes.

Earthquake of the 26th May, 1817.—This Earthquake was experienced at Gungoutri, the source of the river Ganges, by Captains Hodgson and Herbert, during their Survey of the Himalayas. The former in his Journal, (Asiatic Researches, vol. XIV, p. 98,) thus graphically describes the effects of the shock: "At night having prepared the instruments to take the immersion of one of Jupiter's satellites, we laid down to rest, but between 10 and 11 o'clock were awakened by the rocking of the ground, and on running out, soon saw the effects of an Earthquake, and the dreadful situation in which we were pitched in the midst of masses of rock, some of them more than 100 feet in diameter, and which had fallen from the cliffs above us, probably brought down by some former Earthquake.

"The scene around us, shewn in all its dangers by the bright moon light, was indeed very awful. On the second shock, rocks were hurled in every direction from the peaks around to the bed of the river, with a hideous noise not to be described, and never to be forgotten: after the crash caused by the falls near us had ceased, we could still hear the terrible sounds of heavy falls in the more distant recesses of the mountains. We looked up with dismay at the cliffs overhead, expecting that the next shock would detach some ruins from them: had they fallen we could not have escaped, as the fragments from the summit would have flown over our heads, and we should have been buried by those from the middle.

"Providentially there were no more shocks that night. This Earthquake was smartly felt in all parts of the mountains, as well as in the plains of the North West Provinces of Hindoostan." On measuring the height of the cliff under which he was when the shock was felt, Captain Hodgson found it to be 2,745 feet.

In his Journal under date the 30th May, Captain Hodgson remarks: "6. Road most difficult, over masses of rock which have fallen from above into the stream. This station is full of peril, being a very

recent slip of the whole face of the mountain to the left. The broken summits cannot be less than 4,000 feet high: blocks threaten to fall, and are now indeed continually coming down: I have not seen so dangerous a slip. The ruin extends about half a mile: every person made the greatest haste to get past this horrid place. The fracture of the rocks is so fresh, that I suspect this havoc must have been caused by the Earthquake of the 26th, for we heard a great crash in this direction."

The whole of the gigantic accumulations of snow and ice at the *debouche* of the Ganges were found by Captain Hodgson shattered and riven in every direction, and so fresh were the fractures, that he attributed them almost entirely to the Earthquake. These beds were not less than 300 feet in thickness, formed of solid frozen snow, and extending for 4 or 5 miles, as far indeed as the bounding mountains permitted.

In the letter previously quoted, Capt. Hodgson states, "The Earthquake at Gungoutri was by far the most alarming phenomenon of nature I ever witnessed, and the frequent, almost daily, recurrence of the shocks, though slight, made us uneasy, as it shewed that there was some active agent at work perhaps under our feet, which might at any instant bring down the cliffs beneath which we scrambled along on our hands."

The range of this shock appears to have been the same as that of 1803, and its intensity could scarcely have been much inferior. No accounts, however, of any destructive effects on the towns in the Himalayas, have come under my notice, although from the vicinity of some of them to Gungoutri, they could hardly have escaped the effects both of the vibrations and the land-slips caused by them. The dislodgement of a mass of rock 4,000 feet in height and half a mile in length, gives an appalling idea of the intensity of the disturbing force, while it proves how very probable it is, that many of those sudden depressions and elevations of rivers having their sources in mountains liable to such convulsions, are caused by land-slips of this nature. Captain Hodgson alludes to numerous other enormous slips observed after the Earthquake, and to many he assigns the same origin as to that above-mentioned, while others appeared older, and due either to previous convulsions or to the disintegrating effects of atmospheric agents.

Earthquakes of the 27th and 28th May, 1817.—These two shocks are recorded in the same Journal from which the preceding details have been taken. They were both slight in comparison with that of 26th, but still sufficiently severe to cause considerable anxiety to the travellers, and to make them anxious to remove as soon as possible from the spot.

During the same month in which the preceding three shocks occurred, it is stated by Captain Hodgson, that no less than forty others were felt in the districts of Kamaon, of variable intensity, but none very severe, with the exception of that of the 26th.

From the year 1817 to 1831, a blank in the record of central Himalayan Earthquakes occurs, and if during that time any have been

noticed, I have not been fortunate enough to discover them. From 1831 to 1835, a register of the shocks felt at Lohoghat in Kamaon is given in Dr. McClelland's Geological and Statistical Account of that district. Judging from the direction of the larger portion of these shocks, there can be little doubt of their having emanated from the centre of the Himalayan chain, and to this source they are attributed by Dr. McClelland. A few are doubtful, but in default of better evidence, I have included these among the Earthquakes of the central Himalayan region.

Earthquake of the 25th December, 1831.—This shock occurred at 9 P. M. Its duration was about seven seconds, and its direction on a North-west and South-east line. The motion of the earth was undulatory, and the intensity appears to have been slight.

Earthquake of the 2nd July, 1832.—The period of this shock was 11 P. M. "During twelve seconds," Dr. McClelland states, "the earth shook, or rather trembled, and afforded a noise which it is difficult to describe, but which may be compared to the sound of a heavy but transient rush of water. The noise preceded and succeeded the motion about three seconds."

Earthquake of the 18th August, 1832.—Time of shock 7 A. M. The earth trembled for about the space of five seconds: no peculiar concomitant circumstances were observed, except that the weather at the time was hot and sultry.

Earthquake of the 23rd September, 1832.—Time of shock 10 P. M. The circumstances of this shock were in all respects similar to those of the Earthquake of the 2nd July 1832.

Earthquake of the 30th May, 1833.—The earth was found to shake rather violently for about twelve seconds at 12 P. M. It was attended with a noise like that already described.

Earthquake of 4th January, 1835.—About 7 A. M. a slight shock was felt which lasted from fifteen to twenty seconds, but the motion of the Earth was very gentle, and seemed to be on a line between North and South, accompanied by a noise as usual.

Earthquake of the 14th January, 1835.—About 1½ A. M. a shock which seemed to be in the direction of North-west, and more violent than the one on the 4th took place, accompanied by a noise like distant thunder. The motion was tremulous: and in crossing the strata, it seemed to affect one at a time.

At this point Dr. McClelland's register terminates, and no further shocks, to the best of my knowledge, are recorded until the year 1842, when a few of those noted in my register for that year, may be assigned to the tract now under examination. As all the circumstances accompanying these shocks are stated in detail in the register, it will be necessary for me to do little more here than simply to state their dates.

Earthquake of the 5th March, 1842.—Although no information relative to this Earthquake has been obtained from any point farther in the interior of the Himalayas than Simlah, it appears probable from its direction, that it emanated from the central tract, and to this I have

referred it. The intensity of the shock was much greater at Umpoo-sie than at any place to the Westward, and it may thence be inferred, that, as its direction was from Northward to Southward, it originated in the upper portion of Gurhwal, a locality from which so many of the Earthquakes just recorded have emanated.

Earthquake of the 7th September, 1842.—This Earthquake was very slight and unimportant, except from the circumstance of its having been accompanied by an electric shock. There is nothing in the information furnished regarding it to enable us to form any decided opinion as to its place of emanation, and it is only on the ground of a slight probability that I refer it to the Central Himalayan tract.

From the preceding details it appears, that including the Kamaon shocks of May 1817, fifty-five Earthquakes have been experienced in the interior of the Himalayas since 1803, by far the larger portion of which, may without doubt be assigned to the action of disturbing forces, seated under the main axis of this great mountain range. The unrecorded shocks bear in all probability a large proportion to those recorded, and the preceding statement therefore affords but an inadequate representation of the activity of the forces to which the shocks are due. Before leaving this part of the subject, I may very briefly allude to the physical constitution of the central range of the Himalayas. By the uniform testimony of observers who have penetrated to the Snowy Range, it appears that the mountain masses there are composed of primary Rocks, that granite, gneiss and mica slate are chiefly developed, that trap dykes, having a direction parallel to that of the main chain itself have been found, and that signs of very powerful disruptive action are continually apparent. These facts are all characters of the localities from which Earthquake shocks have been found to emanate in other parts of the world, and are consistent with what, *a priori*, we would be led to anticipate, whether we suppose Earthquakes to originate in the movements of a central fluid nucleus, or in the action of more limited and local forces of chemical or mechanical origin, it is natural to infer that their effects will be more perceptible in localities where the solid crust of the earth is fissured and disturbed, and where many "lines of least resistance", so to speak, are furnished, than in others where the strata are more continuous and unbroken. Hence it has been found that in South America, in Italy, and in Scotland, Earthquake tracts are characterised by marks of violent disruptive action, and indications of the existence of subterranean volcanic forces invariably to be discovered. There is yet another point of analogy between the Earthquake Tract of the central Himalayas, and such tracts in other countries, in the extraordinary prevalence throughout the former of hot springs of very high temperature. Some of these I will now mention; commencing with the most celebrated, those of Jumnoutri at the source of the River Jumna, 10,849 feet above the level of the Sea. Captain Hodgson, thus describes these springs under date 21st April 1817, (*Asiatic Researches*. vol. XIV. p. 147.)

"At Jumnoutri the snow which covers and conceals the stream is about 60 yards wide, and is bounded to the right and left by several precipices of granite: it is 40 feet $5\frac{1}{2}$ inches thick, and has fallen from the heights above. The snow is very solid and hard frozen, but we found means to descend through it to the Jumna by an exceedingly steep and narrow dark hole made by the steam (of the springs,) and witnessed a very extraordinary scene, for which I was indebted to the earliness of the season, and unusual quantity of snow which has fallen this year. When I got footing at the stream, (here only a large pace wide,) it was some time before I could discern anything, on account of the darkness of the place, made more so by the thick steam: but having some white lights with me I fired them, and by their glare was able to see and admire the curious domes of snow overhead: these are caused by the hot steam melting the snow over it. Some of these excavations are very spacious, resembling vaulted roofs of marble; and the snow as it melts falls in showers, like heavy rain, to the stream, which appears to owe its origin to these supplies. Having only a short scaled thermometer with me, I could not ascertain the precise heat of the spring, but it was too hot to bear the finger in for more than two seconds, and must be near the boiling point." In a subsequent paper. Captain Hodgson states the temperature of one spring to have been 194.07 which, for the height of Jumnoutri, is very nearly the boiling point of water. "The range of springs," he continues, "is very extensive, but I could not visit them all, as the rest are in dark recesses and snow caverns. The water of them rises with great ebullition through crevices of the granite rock, and deposits a ferruginous sediment, of which I collected some: it is tasteless, and I did not perceive any peculiar smell. Hot springs are frequent in the Himalaya, perhaps they may be a provision of nature, to ensure a supply of water to the heads of the River in the winter season, when the sun can have little or no power in melting the snows in those deep defiles." Constant references are made in Captain Hodgson's Journal to the frequent recurrence of hot springs of considerable extent and high temperature as spots in the upper portion of the course of the Jumna, and they seem indeed to be distributed in remarkable profusion.

In like manner, while exploring the course of the Ganges, Captain Hodgson found hot springs of high temperature, although apparently not so abundantly distributed as on the Jumna. Again to the Eastward at Kedarnath and Buddreenath, numerous springs occur, while in Kumaon they are equally abundant. At the two first mentioned spots travellers have noticed various subterranean noises, as if gaseous matter was escaping with violence. We are not acquainted with the physical geography of the central Range of the Himalayas in prolongation to the Eastward, but it is probable that the phenomena would there be observed. To the westward again Mr. Moorcroft, Lieuts. Broome and Cunningham have found many hot springs in the upper portions of the courses of the Rivers of the Punjaub, so that their occurrence throughout a large portion of the Himalayan chain is established by direct ob-

servation, while it may with considerable confidence be inferred, that in the unexplored intermediate portions, they would also be discovered.*

A disposition exists to attribute these springs to mere local chemical action, but their universal distribution over so wide a range, taken in connection with the fact, that from this range Earthquakes, sometimes of great violence, are repeatedly emanating, has led me to believe that the two classes of phenomena are intimately connected : in other words, that they are joint effects of the same cause. * The hot springs I believe, owe their high temperature to internal chemical action extensively distributed, and the Earthquakes are due to the convulsive efforts of the elastic matter generated by this action, in escaping from the interior of the earth. To attempt to define the nature of this action, while we are wholly ignorant of the chemical composition of the springs would be vain ; but I cannot resist the conviction, that the presence of these hot springs and the occurrence of Earthquake shocks are due to one and the same origin. It was, at one time, supposed, that an active volcanic vent had been discovered in the central Himalayan range, but this is now known to have been erroneous, and the only proofs of volcanic action, consist in the occurrence of Earthquakes, the abundant distribution of springs of high temperature, the presence of Trap Dykes, and indications of powerful disruptive action in the strata.

2. *Earthquakes of the Lateral Himalayan Tract.*

Under this Tract are included the Earthquakes that have been felt throughout the valleys along the Southern Face of the Himalayan range, situated at heights varying from 6,000 to 2,000 feet above the level of the sea. It is proposed to commence with the most Westerly of these, relative to which any authentic information has as yet been obtained, namely that of Cabool ; and having narrated the history of the Earthquakes of that valley, to proceed in a regular manner to the Eastward. Earthquakes of considerable severity have, I believe, been

* The following extract from a letter from A. Campbell, Esq., Political Superintendent of Darjeeling, furnishes some notices of hot and mineral springs in the extreme Eastern portion of the Himalayas.

"3rd Hot and mineral springs.—On the west bank of the Mechi River within the hills, at about six miles above Mechi Gola, there is a mineral spring which runs into the Mechi. I have visited it. The water is quite clear as it issues from the rock, but on the small flat space below there is a reddish deposit, carbonate of iron, I believe. This water has medical virtues ascribed to it. It is heated and used as a bath for rheumatism, cutaneous diseases, &c. Iron ore abounds in the neighbourhood of this spring. It is called "Menchoo" by the Lepchas, which means "medicated water."

"There is a hot spring on the east bank of the great Runjeet River, one day's journey from the monastery of Pemlong. It is called "Puklong Sachoo" (Sachoo means hot spring.) The water has a disagreeable smell, and deposits a whitish substance which is used in medicine.

"There is another hot spring called "Phoog Sachoo," also on the east bank of the great Runjeet, one day's journey to the East of Rinchungpoong. Its deposit is also whitish and its water fetid. I have not visited the two latter nor do I know how far they are apart. They are both in Sikkim, and about three days journey from Darjeeling."

Dated October 7th, 1842.

occasionally experienced to the Westward of Cabool, and especially felt at Herat, but I regret to say I have not succeeded in procuring any information connected with them, beyond the mere fact of their occurrence. Details of Earthquakes at Herat are given, I understand, in the *Zil-Zillee-Nahmah*, a native work on the subject, and as I hope shortly to receive a copy of this book, most kindly procured for me from Cashmere by George Clerk, Esq. Envoy to the court of Lahore, I may be able at a future time to give some account of them.

A. Earthquakes of the Valley of Cabool.

The earliest notice of an Earthquake in the valley of Cabool which I have found, is of that which occurred in the year 1505, during the reign of the Emperor Baber. Lieut. Burnes, (the late Sir Alexander Burnes,) thus alludes to this event in a paper on the Reg-Rewan, a singular phenomenon of sound near Cabool, published in vol. VII, Jour. As. Soc. p. 325, "Convulsions of nature are, however, exceedingly common in this part of the world. Baber mentions one to have occurred in his time, and in this very plain, so that "in some places the ground was elevated to the height of an elephant above its old level, and in others as much depressed." The same event is thus adverted to in Daw's translation of Ferishta's *History of Hindoostan*. "In the year 911 H. (A. D. 1505,) Cabulistan was thrown into great consternation by dreadful Earthquakes, which laid most of the cities in ruins. Baber endeavoured to alleviate this public calamity in such a manner that by his unwearied care, and extensive benevolence, he gained the love and fidelity of all his new subjects."

The Earthquake of 1505, must have been one of great violence, judging from the alterations of the levels of the ground mentioned by Baber, and the extensive destruction of the cities alluded to by Ferishta. Perhaps in both some allowance must be made for oriental exaggeration, but Baber was so remarkable for his minute observations on all natural phenomena which interested him, that less allowance is called for in his case, than in others. From its effects the shock appears to have been felt over nearly the whole of Affghanistan, and the parts which suffered so severely were probably Cabool, Candahar, Ghuzni, and Jellalabad, with others of less note.

A long interval of upwards of three centuries, now occurs during which time I have found no reference to Earthquake shocks in the Cabool valley. That they continued frequently to be felt, I have no doubt, as the inhabitants had become so far familiarised with their phenomena, as to have terms in their language for the varieties of shocks. "A passing shake with a rumbling noise," remarks Sir A. Burnes, in the paper previously quoted, "is called 'Goozur,' to distinguish it from Zil-Zillee, or Earthquake, which the inhabitants denominate a motion that is tremulous." And from time immemorial it has been found necessary to construct the larger number of the houses at Cabool, of wood, to enable them to resist better, the constantly recurring shocks. In the year 1808, Mr. Elphinstone (*Journey to the Court of Cabool*, vol. ii, p. 173,) "Most of the buildings of Cabool are

of wood, a material recommended by its power of resisting the frequent Earthquakes with which this place is visited. It is not improbable that the Zil-Zillee-Namah, may furnish some materials for filling up this long interval, but from this little more I fear can be expected than a mere narrative of the effects of shocks, since more intelligence than its author could have possessed is necessary to distinguish the phenomena, which point to the causes of these convulsions.

It is not until the year 1829, that we have any specific notice of another Earthquake in the Cabool valley. This notice is a very brief one by Sir A. Burnes. About six years previous to his visit to Cabool in 1836-37, a very severe Earthquake had been felt at that place, and he adds, that shocks happen so frequently as twice and thrice a month. On one night, the 14th December 1837, he mentions that no less than three shocks were experienced.

In 1836, Mr. Vigne mentions* several shocks of Earthquakes were experienced by him at Cabool, all however slight, and he adds that the average number of shocks during the year is about twelve. Mr. Masson also† records the occurrence of several during his residence at the capital of Affghanistan. The notices of both of those travellers are however very meagre, and the shocks seem to have been so frequent, as to deprive them of interest in their eyes.

The preceding form all the information I have been able to collect relative to the Earthquakes of the Cabool valley. The details are, it will be observed, of a very limited character, and establish only the general fact, of disturbing forces being continually in operation beneath this valley, with the additional circumstance of considerable alteration of levels having been the effect of one of the shocks, that namely of 1505. It is impossible to say whether or not all the shocks are local, and due to forces acting immediately under the valley of Cabool. The whole of the tract around is said to exhibit indications of volcanic action, and it is probable therefore, that many of the numerous shocks may be secondary ones, having originated either to the Eastward or Westward. I am indebted to Captain Hutton, Bengal Army, for the following remarks on this point, which shew the general prevalence of volcanic action throughout the country around Cabool, although nothing is said relative to such action within the valley itself. Captain Hutton thus writes: "It was reported by some intelligent men whom I met with at Candahar, that a volcano exists in the Huzzareh mountains (to the westward of Cabool,) but that few are living (1840) who remember to have seen it active. The appearances of a volcanic mountain, the effects, &c. were so well described, that I can hardly think they were deceiving me. All Affghanistan gives indication of violent volcanic action, and the country from the Kojuck range to beyond the Helmund, may be termed a volcanic district, the mountains being usually accompanied along the base by a low range of basaltic or other trap rocks."

* Vigne's Travels, p. 812.

† Masson's Travels, vol. III. p. 8.

B. Earthquakes of the Valley of Jellalabad.

In the Register of Earthquakes for 1842, I have stated the grounds on which I consider the valley of Jellalabad to be the seat of Earthquaking forces. It is well known that the areas over which the causes of such forces (of whatever nature we may consider these) extend, is frequently very great; and that a connection may exist between the forces that disturb the Cabool and Jellalabad valleys, is more than probable. But, from the information as yet obtained, it is justly to be inferred that these forces act independently, and I have therefore placed the two valleys as distinct portions of the lateral Himalayan tract.

Our information relative to the Earthquakes of the Jellalabad valley is all subsequent to the year 1842. Since the publication of the Register for that year, I have obtained some farther information relative to the Earthquakes of this locality, which I purpose giving here.

Earthquake of 19th February, 1842.—The following extract from Lady Sale's Journal of the imprisonment, gives details of the shock as experienced at the fort of Buddeabad, in the valley of Lughman:—

"At noon I was on the top of the house, when an awful Earthquake took place * * * *. For some time I balanced myself as well as I could, till I felt the roof was giving way. I fortunately succeeded in removing from my position before the roof of our room fell in with a dreadful crash * * * *. When the earthquake first commenced in the hills in the upper part of the valley, its progress was clearly defined coming down the valley, and throwing up dust like the action of exploding a mine. Our walls and gateways and corner towers, are all much shaken, or actually thrown down. We had at least twenty-five shocks before dark, and about fifteen more during the night, which we spent in the court yard. * * * * Our fort is the best of forty that have suffered in this valley, and many are entirely thrown down. In one a tower fell and crushed five women and a man, others have not a wall remaining."

Lieut. Vincent Eyre thus describes the same event. (Military Operations at Cabool, p. 262.)

"February 19th. On the 6th we had a heavy fall of rain, since which the weather had become exceedingly close. This morning it was observed that an unusual degree of heat and stillness pervaded the air. Whether these were premonitory symptoms of what was to happen it is impossible to determine: but at 11 A. M. (?) we were suddenly alarmed by a violent rocking of the earth which momentarily increased to such a degree, that we could with difficulty maintain our balance. Large masses of the lofty walls that encompassed us fell in on all sides with a thundering crash. A loud subterraneous rumbling was heard as of a boiling sea of liquid lava, and wave after wave seemed to lift up the ground on which we stood, causing every building to rock to and fro like a floating vessel. After the scenes of horror we had recently witnessed, it seemed as if the hour of retribution had arrived, and that heaven designed to destroy the blood-stained

earth at one fell swoop. The dwelling in which we lodged was terribly shaken, and the room inhabited by Lady Sale fell in, her ladyship, who happened to be standing on the roof, having barely time to escape. Most providentially all the ladies with their children made a timely rush into the open air at the commencement of the Earthquake, and entirely escaped injury. General Elphinstone being bed-ridden, was for several moments in a precarious position, from which he was rescued by the intrepidity of his servant, Moore, a private of H. M. 44th, who rushed into his room, and carried him forth in his arms. * * * * *. The quaking continued for several minutes with unabated violence, and a slight tremor of the earth was perceptible throughout the remainder of the day. The Affghans were for the time-being overwhelmed with terror: for though slight shocks of Earthquake are of common occurrence in every year during the cold season, none so fearful as this had visited the country within the memory of the present generation. We shortly learned that our fort had been singularly favoured; almost every other in the valley having been laid low, and many inhabitants destroyed in the ruins. The town of Turghurree especially seems to have suffered severely, scarcely a house being left standing, and hundreds of people having been killed in the fall.

"Shocks of Earthquakes continued to occur every hour: some of which were rather severe."

Lady Sale records farther shocks on the following days:—

22nd February.—We had Earthquakes day and night; less severe but equally frequent. * * * * *

23rd February.—This has been a very close and gloomy day: Earthquakes frequent, and some very sharp ones.

24th February.—Very few shocks and those gentle ones; but all last night and great part of to-day, particularly late in the evening, there was a tremulous motion as if a ship had been heavily struck by a sea, generally feeling as if on the larboard quarter, and accompanied by a sound of water breaking against a vessel. At other times we have just the undulatory motion of a snake in the water: but the most uncommon sensation we have experienced has been that of a heavy ball rolling over our heads, as if on the roof of our individual room, accompanied by the sound of distant thunder.

Lient. Eyre's narrative furnishes me with materials for continuing the list of shocks.

March 3.—Under this date Lient. Eyre remarks, that severe shocks of Earthquake continued every day.

April 20.—There was a severe shock of an Earthquake again to-day. These shocks have always appeared to me to be in some way connected with heavy rain before-hand.

June 4.—A shock of an Earthquake felt to-day.

June 10.—A smart shock of Earthquake felt during the night.

June 29.—A shock of Earthquake.

Unfortunately no detailed Register of the numerous Earthquakes experienced at Jellalabad during the same time as the preceding has, to

my knowledge, been kept. Shocks continued, however, to be experienced in that valley up to a period later than recorded in any of the Journals of the British prisoners in Affghanistan which I have yet seen. Two are noticed in the Register for 1842: namely, the Earthquake of the 21st July 1842, and that of the 25th of October of the same year, and with the latter, our information relative to the Earthquakes of the valley of Jellalabad terminates.

There are some very interesting points connected with the Earthquakes of this tract to be discussed, but I reserve all comment upon them until I enter upon the third part of this memoir.

C. Earthquakes of the Valley of Cashmere.

From remote antiquity, Earthquakes are known to have been experienced throughout the valley of Cashmere, but so far as I yet know, the dates of these have not been recorded, nor have any of their phenomena been described. The shocks, however, have never been of great violence, although it has been found necessary to provide against their effects by employing wood largely in building.* In describing the Juma Musjid, or

* Since the above was written, I have been favoured with a sight of a copy of Vigne's Travels in Cashmere, by Dr. Jameson, in which some detailed information relative to Earthquakes in the valley is to be found. It is too late now to include this in the body of the memoir, and I am therefore obliged to give it in this form.

"On the night of the 26th June 1828," Mr. Vigne remarks, (vol. i, 281.) "at half past ten, a very severe shock was felt, which shook down a great many houses and killed a great number of people: perhaps 1,000 persons were killed and 1,200 houses shaken down: although being built with a wooden frame-work, the houses are less liable to fall than an edifice of brick or stone. The earth opened in several places about the city: and fetid water, rather warm, rose rapidly from the clefts and then subsided. These clefts being in the soil, soon closed again, and left scarcely any traces. I saw the remains of one fifteen yards long and two wide: but it was filled up or nearly so. Huge rocks and stones came rattling down from the mountains. On that night only one shock took place: but just before sun-rise there was another, accompanied by a terrific and lengthened explosion, louder than a cannon. On that day there were twenty such shocks, each with a similar explosion.

"The inhabitants were of course in the open country. The river sometimes appeared to stand still, and then to rush forward. For the remaining six days of Zillheja, and the whole of the two next months of Moharrem and Safur, there were never less than 100, and sometimes 200 or more shocks in the day, each accompanied by an explosion: but it was remarked, that when the explosion was loudest, the shock was the less. On the sixth day (after the great shock?) there was one very bad shock, and on the fifteenth, at three o'clock, was the worst, and there were three out of the whole number that were very loud.

"At the end of the two above-mentioned months, the number decreased to ten or fifteen in the 24 hours, the noise became less, and the Earthquakes gradually ceased. About this time the cholera made its appearance. A census of the dead was taken at first, but it was discontinued when it was found that many thousands had died in twenty-one days.

"In Cashmere there had been no great Earthquake before, within the memory of any living person, excepting one about 50 years ago, which was rather severe, and lasted at intervals for a week. An Earthquake is mentioned in Prinsep's Tables, as having taken place in A. D. 1552. Shocks are now common, and the houses are built with a wooden frame-work so as to resist them. They are still more common I should say at Kabool, where I have felt three or four in four months: but they are usually too slight to do harm."

The following is Mr. Vigne's account of the "burning ground" alluded to above.

"The most singular place in Cashmere is Sahoyum, the "burning ground" mentioned by Abul Fuzl, in the Ayin Akheri. It lies near the village of Nichi-Hama, in the pergunnah of Muchipoora, at the north-west end of the valley where the plain is about 6100 feet in height. About thirty-six years ago, an intense heat was found to

great mosque in the city of Cashmere. Mr. Moorcroft, (Vol. II, p. 121,) states, "that the structure consists in great part of wood, and the three hundred and eighty pillars which ornament the temple are composed of square blocks of deodar, built up like brick-work in alternate headers and stretchers, as the form of bond is technically called." "The peculiarity of their structure," Mr. Moorcroft remarks, "was no doubt suggested by the occurrence of Earthquakes, which are frequent in Cashmere, though not very violent. Certain it is, that although the roof and walls have been rent and shattered in various places, not one of the pillars appears to have been seriously injured, or to have deviated from its original perpendicular." "The traditions of the country assert," says Mr. Moorcroft in describing the valley of Cashmere, (Vol. II. p. 109,) "that the whole of Cashmere, intending thereby the principal line of valley, was originally one large lake, and the aspect of the province confirms the truth of the legend, the subsidence of the waters being distinctly defined by horizontal lines on the face of the mountains: it is also not at all unlikely to have been the scene of some great convulsion of nature, as indications of volcanic action are not unfrequent: hot springs are numerous: at particular seasons the ground in various places is sensibly hotter than the atmosphere, and Earthquakes are of common occurrence." Whether recent travellers who have explored the valley of Cashmere have collected any farther evidence as to the former condition of the province, I am unfortunately unable to say, as I have not yet been able to consult their works. That indications of active volcanic action are numerous and remarkable, I learn from Dr. Falconer, the latest of the Cashmerian travellers. He informs me that a singular "field of fire" exists in the valley, of considerable dimensions, and through crevices in which flames continually issue. The outlines of this volcanic tract are distinctly defined, and the action appears to be strictly local, the soil is completely burnt, and in some spots I believe, petrified. The igneous action has continued now for upwards of two centuries, as the existence of this remarkable spot is certified by Abul Fazil, the learned minister of the Emperor Akber.* Mr. Moorcroft in his travels, (Vol. II.

issue from the spot which is about an acre in size, and in which there are three places more particularly burned. A similar phenomenon had been observed about thirteen years before. The soil, which is a mixture of clay with a little sand, has been fused by the heat from below. One bank is twenty feet above the other. It burned in the time of Atar Mahommed Khan, the Patan Governor, for the space of one month. A white smoke was occasionally seen to issue from the soil, but no fire or sulphureous smell was perceivable, and no fissures opened in the ground. The Pundits hastily assembled from all quarters, scraped away the earth, and placed there their brass cooking pots, with rice and water in them. The rice was cooked in half an hour, and then scattered around for the birds to feed on, the Pundits meanwhile offering up their prayers. No Earthquake took place at the time: no noises were heard, nor did any heat or smoke appear there when the great Earthquake took place in 1828.

"I should think that few would withhold their belief in the fact of volcanic action now being at work under the valley of Cashmere, after listening to an account of this Earthquake." Vol. I. p. 280.

* For the above particulars, I am indebted to Dr. Falconer. They were given verbally, and are quoted from memory, so that they are rather indefinite; but as Dr. Falconer's own account of the phenomenon may be expected ere long, it will be in my power to correct and enlarge the above notice.

p. 277,) mentions a hill within three days' journey of the city of Cashmere, from which loud explosions are heard at intervals, accompanied by the escape of gaseous matter, with force sufficient to tear off the doors and windows of buildings situated upon it. There was nothing on the hill resembling a crater, but the inhabitants on the spot asserted a distinct recollection of the explosions.

About the years 1831-32, a series of Earthquakes occurred in Cashmere, which continued for six months without interruption. These I am informed were chiefly confined to the valley, and scarcely, if at all, experienced beyond it, thus proving the local action of the forces to which they were due. In a letter formerly noted from the late Sir A. Burnes to J. Prinsep, Esq. dated 23rd January (?) 1832, it is stated, "The Earthquakes of Cashmere are frequent, and the natives inform me, that the shocks are more severe nearer the mountains."

That the valley of Cashmere is a focal Earthquake tract, or in other words, that disturbing forces giving rise to Earthquake shocks, are in active operation beneath its surface, and that these forces act independently, and without connection with those of other focal tracts in the Himalayas, are points I think very clearly established by the preceding details. Unfortunately, the nature of the information obtained does not warrant deductions of a more special character, but those actually made, are not devoid of interest, as illustrating the general distribution of active volcanic forces throughout the lateral region of the great mountain range of India.

D. Earthquakes of the Valley of Nepaul.

Traditional accounts of Earthquakes in the valley of Nepaul exist; and in the historical records preserved by the Brahmins of that country, a shock of great severity, by which the cities of Mangab, Patan and innumerable towns were utterly destroyed, and thousands of their inhabitants were killed, is said to have occurred about six centuries ago; but it is not until the year 1833, that we have any detailed accounts of such convulsions. On the 26th of August of that year, a most destructive Earthquake occurred, of which ample details have been furnished by Archibald Campbell, Esq., then Assistant to the Resident at the Court of Nepaul, and accounts of the progress and effects of the shock beyond the valley have been collected and recorded by James Prinsep, Esq. I propose combining the detached narratives of these two gentlemen, so as to form a general account of the course and effects of the shock.

Earthquake of the 26th August, 1833.—The first shock of this Earthquake was experienced at Katmandu, the modern capital of Nepaul, about 6. p. m. It extended throughout the valley and neighbouring hills, being felt Westward in the valley of Nayakot and Dúny Byas: eastward at Panouti, Baneppa, Dulkele and Pholam Chok; and southward at Chitlong, Chisagarby, Etounda and Bissoulea. The shock lasted about 40 seconds, and during its continuance, there was a distinctly audible noise as of ordnance passing rapidly over a drawbridge. This rumbling noise came from the Eastward, and Dr. Camp-

bell says, "I felt it was travelling with the speed of lightning towards the West, and just under my feet: the houses shook most violently, and trees, shrubs, and the smallest plants were set in motion, not shaking, but waving to and fro from their very roots." No injury to life or property was done by this first shock, either in Nepaul or in its course to Calcutta, where it appears to have been experienced at about 6h. 28m., Katmandu time. The motion of the earth was undulatory, as of a large raft floating on the ocean, and the direction of the swell was from North-east towards South-west.

At 10h. 45m., by a good going clock, a second shock occurred, of the same intensity, equal duration, and like character with the preceding. This also was experienced at Calcutta.

The great shock was felt at Katmandu at about 5 minutes to 12 p. m., Calcutta time. It commenced very gradually by a gentle motion of the earth, accompanied by a slight rumbling noise: soon however it increased to a fearful degree, the earth heaved as a ship at sea, the trees waved from their roots, and houses moved to and fro from the perpendicular. Horses and other cattle terrified, broke loose from their stalls, and it was difficult to walk without staggering as a landsman does on ship-board. Dr. Campbell, as an eye-witness, thus describes the scene: "The earth heaved most fearfully, and when the shock was at its worst, we heard the clashing of falling tiles and bricks in every direction: and to add to the impressiveness of the scene, a general shout rose from the people in all directions. The murmur of human prayers was carried audibly from the city to our grounds, (a mile,) and nothing could be more imposing and vast than the whole scene. In a dead calm, the noise of an hundred cannon burst forth: full grown trees bended in all directions, and houses reeled about like drunken men. In our grounds no lives were lost; but in Katmandu 19 persons were buried under the ruins of their own houses, and in the towns of Bhatgaon and Patan, many more." Dr. Campbell's estimate of the duration of this great shock, varies in his letters and memorandum published in the *Journal of the Asiatic Society*, (Vol. II. p. 439-564). In the former the duration is said to have been one minute, in the latter, three minutes at its fullest force. During the following hour, from 12 to 1 a. m., there were six distinct and strong shocks, the ground in the intervals being scarcely, if at all steady, and from midnight of the 26th to the morning of the 27th, twenty shocks are said to have been felt, while during the whole of the 27th and 28th, the earth was in a constant state of "tremblement."

The comparative intensity of the shock at different points in its course, can only be estimated, in the absence of proper instruments, by its destructive effects on buildings when exposed to its influence. Dr. Campbell has furnished me with materials, which in this point of view are valuable, by having collected accounts in detail of injuries sustained by the various towns throughout the valley of Nepaul, arranging these with reference to their bearing from Katmandu as a central point. This Table I here transcribe:—



Table shewing the number of Lives lost and Buildings destroyed by the Earthquake of the 26th August, 1833.

| Places. | Killed. | Wounded. | Houses Destroyed. | Temples and other Buildings. |
|--|---------|----------|-------------------|---|
| British Residency grounds, City of Katmandu, .. | 0 60 | 0 38 | 1 400 | —Two pillars built by the minister, each upwards of 100 feet high: the large temple of Jagarnath built by Rau Bahadur, after seven years' labour: and about a dozen temples destroyed. |
| <i>South of the Capital.</i> | | | | —The modern built garden houses of several members of the minister's family have been rendered untenable: one of them, a handsome and ornamental edifice, has come to the ground. |
| Patan, | 6 | 25 | 285 | —A crack in the ground, 20 feet in length, was observed at this village on the morning of the 27th, the entire number of houses in it was 206, more than a third of the whole were destroyed, and about 100 men (?) have been much damaged. |
| Sano Gaon, | 0 | 0 | 40 | |
| Harra Siddhi, | 0 | 0 | 20 | |
| Teshu Gaon, | 0 | 0 | 25 | |
| Selli Gaon, | 0 | 0 | 16 | |
| Pagah, | 0 | 0 | 24 | |
| Kuhnah, | 1 | 0 | 130 | |
| Baghmati, | 0 | 0 | 80 | |
| Phurphing, | 0 | 0 | 8 | |
| Chappa Gaon, | 0 | 0 | 35 | |
| Peang, | 0 | 0 | 8 | |
| Taibu, | 0 | 0 | 18 | —The injury sustained here is proportionally greater than at any other part not to the East of Katmandu. |
| Bara Gaon, | 0 | 0 | 35 | |
| Bali, | 0 | 0 | 3 | |
| Pahon, | 0 | 0 | 3 | |
| Sasanelly, | 0 | 0 | 2 | |
| Lubu, | 0 | 0 | 25 | |
| Sano, | 0 | 0 | 7 | |
| Hills about Sasanelly, .. | 0 | 0 | 20 | |
| <i>East of Katmandu in the Valley.</i> | | | | |
| Deo-Patan, | 3 | 0 | 30 | —At the eastern extremity of Deo-Patan is the temple of Paspanath, containing Pusputi Jee, the patron deity of the Brahminical inhabitants of Nepaul. The building escaped unhurt, to the great joy of the rulers and people of the land, who attribute the circumstance solely to the interference of the blind goddess in behalf of their favourite god, rather than to the stout deposition of brick and mortar. |
| Handi Gaon, | 0 | 0 | 20 | |
| Nag Desa, | 4 | 0 | 20 | |
| Bareh, | 5 | 0 | 20 | |
| Tenir, | 0 | 0 | 150 | |
| Gou Karan, | 0 | 0 | 8 | |
| Changu, | 0 | 0 | 20 | |
| Sankhu, | 20 | 5 | 45 | |
| Bhat Gaon, | 200 | 104 | 2000 | |
| <i>East of Katmandu beyond the Valley, but in the immediate neighbourhood.</i> | | | | |
| Sangu, | 2 | 0 | 8 | —The total number of houses in Bhatgaon is reckoned by Mr. Hodgson at 4700, 3-4ths of the town is said to be destroyed: 2000 is the average of many accounts; six or eight fine temples destroyed, and a statue of Raja Runjit Mall, one of the Newar princes of the Bhatgaon division of the valley. |
| Baneppa, | 10 | 0 | 20 | |
| Nala Gaon, | 6 | 0 | 11 | |
| Panouti, | 18 | 0 | 19 | |
| Dulkele, | 10 | 0 | 21 | |
| Carried over, .. | 345 | 172 | 3,577 | —Six persons were killed under the ruins of one house in this village: their remains were found where they had gone to sleep. |



| Places. | Killed. | Wounded. | Houses Destroyed. | Temples and other Buildings. |
|--|---------|----------|-------------------|--|
| Brought over, .. | 345 | 172 | 3,577 | |
| Phulam Chok, .. | 60 | 0 | 300 | —A fine temple destroyed here. |
| <i>North-East of the Valley, and more remote.</i> | | | | |
| Dhulaka, .. | .. | .. | .. | —In this direction the Earthquake was much more severely felt. Kuti, a town on the Bhote frontier, on the road to Lassa, is said to have been nearly all destroyed: it contains about 600 houses; 50 of which only remain. At Listigaon, also on the Bhote frontier, a large portion of a hill came down, and an iron bridge was destroyed. |
| Mundan Pahar, .. | .. | .. | .. | |
| Kan Sing Chok, .. | .. | .. | .. | |
| Kapa, .. | .. | .. | .. | |
| Kuti, .. | .. | .. | .. | |
| Listi Gaon, .. | .. | .. | .. | —At Kan Sing Chok, in the same direction, vulgar report says, that for four or five days before the Earthquake took place, noises similar to the firing of cannon were heard as if under ground, and in this neighbourhood the high road to Lassa, is said to be in many places blocked up by the fallen earth from the mountains. |
| Lhipa, the country residence of Colonel Runbir Singh, 20 miles from Katmandu on the Lapa road, by the Kuti Pass, is seriously injured. Many small houses attached were destroyed and several lives lost. | | | | |
| <i>West of Katmandu.</i> | | | | |
| Swambunath, .. | 0 | 0 | 3 | —One small temple destroyed and the large one injured. The form of the large one must have preserved it. It is the chief Buddhist temple in the valley, built in the fashion of that religion, an immense circular mound of brickwork, surmounted by a four-sided spire or jweet. |
| Hat Chok, .. | 0 | 0 | 3 | |
| Narod Devi, .. | 0 | 0 | 1 | |
| Changu Narayan, .. | 0 | 0 | 2 | |
| Goorkha Cantonment or Campoo, .. | 0 | 0 | 4 | —The house of a Captain much injured here. |
| Kertipur, .. | 0 | 0 | 14 | —Contains 532 houses, and is built along the ridge and brow of a hill 300 feet higher than the surrounding part of the valley. Its tenements are old and frail. To account for its escape the inhabitants say, "That some nights previous to the Earthquake and on the memorable night itself, a large tiger or leopard paraded several streets of the town, without molesting any of the inhabitants. This forbearance was reciprocal for the 'guardian angel' was allowed to continue his protecting visits: the admiring crowd, firm in the belief of correct vision, hailed him as Ramji, another incarnation of the 'great preserver.'" |
| Thankote, .. | 0 | 0 | 23 | |
| <i>West of the Valley.</i> | | | | |
| Demy Byas and neighbouring Hills, .. | 10 | 0 | 40 | |
| Tewanpur, .. | 0 | 0 | 10 | |
| Nayakoth, .. | 0 | 0 | 3 | |
| <i>North of Katmandu.</i> | | | | |
| Dhurmtuli, .. | 0 | 0 | 2 | |
| Huken Gaon, .. | 0 | 0 | 1 | |
| Toka Gaon, .. | 0 | 0 | 15 | |
| Burha-tul Kanth, .. | 0 | 0 | 2 | |
| Chapaly, .. | 0 | 0 | 7 | |
| Dharmpur, .. | 0 | 0 | 20 | |
| <i>South of the Valley.</i> | | | | |
| Chitlong, .. | 0 | 0 | 14 | —The fort here much injured: a large portion of the breastwork facing the South has fallen in, and the wall in many other places, although not fallen, is seriously injured. |
| Chisagarhy, .. | 0 | 0 | 0 | |
| Mukwanpur, .. | 0 | 0 | 0 | —The fort here has also suffered, but in a much less degree than the one at Chisapani. |
| Total, .. | 414 | 172 | 4,040 | |

The preceding details establish very distinctly, that toward the North and East of the valley, the disturbing force was much more violent in its action than toward the South and West. In the former direction therefore we are to look for the focus of the shock, and it seems probable, from all the facts recorded, that this was situated among the hills which bound the valley of Nepaul on the North-eastward. As Dr. Campbell's views on this point coincide with my own, I will take advantage of his remarks upon it: "It would appear," he says, "that the most extreme violence of the shock, so far as its occurrence is as yet known, was expended within a tract of country extending from this side of the great Himalayan range on the North, to the course of the Ganges on the South, and from the Arun river (in the Nepaul hills) on the East to the Western branches of the Trisál Ganga on the West, comprising a space of about 200 miles from North to South, and 150 from East to West. In this space, the valley of Nepaul, though not geographically the central point, is most assuredly the portion that has suffered the greatest violence of the calamity," and may therefore be fairly considered as the spot whence the shock emanated.

The intensity of the shock to the North-east of Nepaul, and the direction of its motion, had led Mr. Prinsep, in his notice of the Earthquake, to anticipate intelligence of some fearful catastrophe in the vicinity of Lassa, in Thibet. By a most fortunate coincidence, Dr. Campbell was enabled to collect some information which elucidated this point in an interesting manner. In the notice of the Earthquake by the Secretary to the Asiatic Society, in the Journal for August (1833,) Dr. Campbell remarks: "he expressed a belief that the greatest intensity of the shock would be found to have occurred beyond the Himalayas, in the direction of Lassa:" and judging by the direction from which the shock was felt to have proceeded, and its intensity in the valley of Nepaul, such was the probability, though other has turned out to be the fact, and that upon good authority.

The recent return from Pekin of an Embassy from Nepaul, to the Court of the Celestial Emperor, has furnished authentic information on this subject, which might otherwise have been long wanting: and the whole tenor of it shews, that the great Himalayan range itself, and the country on this (the South) side of it, was alone the theatre of the Earthquake's presence, and that it was not even in the slightest degree felt beyond a very short distance on the Thibetan side of these huge mountains. The embassy was at Lassa on the 26th August, when and where the shock was not experienced. At Digarchi, in the following month, it first received accounts of its occurrence from Nepaul: to the inhabitants of that place the circumstance was however only from reports brought from this side of the mountains: along the road from Digarchi the answer to all enquiries was the same, "no Earthquake on the 26th August," and not until its arrival at Tingri, was it found that the shock had been felt. Tingri is a small Chinese post, immediately beyond the great Himalaya, and the first stage on the table-land (as it is called) of Thibet, going hence to Lassa (by the Kuti or Eastern

Pass from the valley of Nepaul.) From Tingri to Kirung, a distance of 8 or 10 marches, the route is nearly due West, running along and through the Northern side of the Himalaya; and throughout this tract, though but thinly inhabited, authentic reports of the occurrence of the shock were received. By Kirung (the Eastern Pass from the valley into Bhote) the mission penetrated the great range, and at each stage (four in number through the Pass) intelligence of the occurrence was communicated by the few individuals who inhabit that wild and sterile region. But such information was not required, as its effects were sufficiently manifest: in the village of Kirung, itself, supposed to consist of 400 houses, 60 were fairly demolished, and many more seriously injured: two men had been killed under the ruins of their houses, and about a dozen wounded. From the exit of the Pass to Katmandu there are no towns along the route, and scarcely any villages: but at many places, insulated houses of the mountaineers had been thrown down, and the precipitous banks of hills and mountains had been thrown into the subjacent valleys.

Tingri, therefore, in latitude 28° may be fixed upon as the extreme Northern limit of the influence of the shock, and I now proceed to trace its progress in other directions. Before, however, quitting the valley of Nepaul, I may mention as an interesting fact, that torrents of rain fell immediately after the Earthquake, washing down many of the walls which had previously been only shaken.

In tracing the course of the Earthquake to the westward of Nepaul, the diminution of its intensity is remarkably exhibited. At Gorkha, Dr. Campbell mentions, that only two houses were destroyed; at Palpa farther to the Westward, none; and at Doti on the borders of Kemaon, the shock was felt, but by no means severely. At Lohooghat in Kemaon, Dr. McClelland states, that it was scarcely felt at all, so slightly indeed, that he himself was unconscious of its occurrence, although it was perceived by a friend on whose authority he registered it. In the mountains, therefore, the influence of the Earthquake appears, in so far as shewn by the information recorded, to have extended from the meridian of Lohooghat, about 80° E. to that of Tingri, about 87° E. or over about 7° of longitude. In the plains, however, it extended considerably farther both to East and Westward. In the latter direction, the extreme point appears from the published accounts to have been Delhi, in longitude $77^{\circ} 16'$ E., or nearly 3° farther to the West than Lohooghat. Toward the East, the boundary was the meridian of Chittagong, $91^{\circ} 42'$ E. in the Plains, or nearly 5° to the Eastward of Tingri, which so far as we know, formed the corresponding limit in the mountains. The Southern line appears to have been nearly the parallel of 22° N. latitude. Thus then the entire range of the Earthquake of August 1833, was from between 28° and 29° to 22° North latitude, and from about 77° to 92° East longitude, embracing accordingly 7° of latitude and 15° of longitude; a superficial extent, upwards of four times that of the British Isles, and about twice and a half that of the kingdom of France!

The following summary by James Prinsep, Esq. may appropriately conclude the detail of the Earthquake under review.

"The direction of the vibration was from North-west to South-west: there were three principal shocks; the first about half-past six p. m.; the second at half-past eleven; and the third, or most severe shock, at about five minutes to twelve, Calcutta time. In the places where it was most felt, slight and continued vibrations seem to have been experienced for the whole of the day following. As the time of the second vibration was accurately noted in Calcutta by the stopping of an astronomical clock, we may assume it as the best point of comparison with the times noted at other distant points. Applying the difference of longitude, a few of them may be thus classed:—

| | | <i>Observed Time.</i> | | <i>Diff. Long.</i> | <i>Cal. Time.</i> | <i>Effects.</i> |
|--------------------------------|-----------|-----------------------|--------|--------------------|-------------------|----------------------------------|
| Katmandu, Nepal, second shock, | | 10h. 45* | + 12m. | = 10h. 57m. | | Very severe, with loud noise. |
| Rungpur, | ditto, .. | .. 11 20 | — 2 | = 11 18 | | Many houses injured, loud noise. |
| Monghyr, | ditto, .. | .. 11 27 | + 7 | = 11 34 | | Walls cracked, noise heard. |
| Arrah, | ditto, .. | .. 11 15 | + 14 | = 11 29 | | Walls injured, loud noise. |
| Under Rotas Hills | ditto, .. | .. 11 10 | + 20 | = 11 30 | | |
| Goruckpur, | ditto, .. | .. 11 20 | + 19 | = 11 39 | | Walls cracked &c. &c. |
| Allahabad, | ditto, .. | .. 11 0 | + 28 | = 11 28 | | Hollow sound from the river. |
| | | | 4 | | | |
| Bankura, | ditto, .. | .. 11 30 | + | = 11 34 | | None such since 1814. |
| Calcutta, | ditto, .. | .. | | = 11 34 48 | | No injury done. |

At Monghyr, Rungpur, Mozuffurpur, Mallai, and other places within direct line of influence, many houses were destroyed or injured, and the alarm was great.

As all comment on the phenomena of this shock is reserved to a future period, I need only now state, that I am not aware of any Earthquakes having occurred in Nepaul since 1833. I ought however before this to have mentioned that in 1829, daily shocks continued to recur for 40 days, although none were equal in intensity to that of the 26th August, 1833. The following Register of the shocks that followed the great one of the 26th was kept at Katmandu by Captain Robinson. Regarding them Dr. Campbell remarks: "Many of them have been severe, and throughout the whole course of these visitations, there have been two distinct varieties observed in the character of the shocks, all those at the commencement were of the undulatory or swinging kind: the others wanted the swell, and were a violent, up and down shaking, with little lateral motion. The first may be called the horizontal, the latter the vertical variety. The former alone have been destructive to property, while the latter, from the greater noise by which they are accompanied, and the more rapid oscillations of the ground, are perhaps the more terrifying.

* Time marked by a good going clock, which was stopped by the third shock. Its pendulum vibrated from North to South.

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Register of Earthquakes experienced at Katmandu, from 25th August to 26th November, 1833, inclusive.

| Date. | Time. | Remarks. |
|----------------------|---|--|
| 1833. | | |
| Aug. 26th | One at 5h. 55m. P. M. Another at 10h. 50m., 10h. 58m. P. M. was the time the great one com- menced, and its duration was 3m. | All of the undulating kind, as well as nine others that occurred during the same night. |
| „ 27th | 4h. 53m. A. M. 5h. 20m. A. M. 5h. 26m. A. M. | } Also undulatory. |
| „ 28th | 7h. 15m. A. M. 4h. 55m. P. M. | |
| „ 30th | Four shocks: one at 9 A. M. | } Also undulatory. |
| „ 31st | Two during the night. | |
| Sept. 1st to 11th | Ten shocks. | Slight. |
| Oct. 4th | 7h. 30m. A. M. a smart one, 1m. duration. | This was a severe one, and of the vertical kind: it was felt at Allahabad and Goruckhpur: also at Calcutta. |
| „ 18th | 4h. 55m. P. M. Severe and ushered in with a loud noise. | Same character as last one: was felt slightly at Allahabad: also at Calcutta. |
| „ 26th | 10h. 37m. A. M. Slight. | |
| Nov. 8th | 3h. 55m. A. M. Slight. | |
| „ 16th | At midnight severe. | |
| „ 26th | 11h. 45m. P. M. Severe. In all 39 shocks have been noted, many slight ones have occurred besides. | This was of the up-and-down kind, lasted a minute, occurred at the full moon when the whole people of Nepaul were praying at Pas- punath; excited a great commotion, and was the only instance where the prophecies of the Brahmins were realised, although a hundred lucky moments had been determined on for the last three months for the occurrence of shocks. |

I have examined such Meteorological Registers of 1833, as I have been able to procure, with the view of ascertaining whether any indications of atmospheric disturbances accompanying the Earthquake were to be detected, but without success. Such a Register for Nepaul. I have not however been able to procure, and I regret it, since it was there, as the seat of the Earthquaking force, that the disturbances might have been most confidently anticipated. Although torrents of rain fell in the valley, the Rain Guage at Calcutta on the same day is recorded as empty.

With the physical structure of the valley of Nepaul I am not acquainted, nor have I found any trust-worthy account of its geology, or that of the adjoining mountains. Colonel Kirkpatrick, in his Work on Nepaul, states, (p. 177), "With regard to volcanoes, although I met with no traces of any in our route, yet it is certain that there are some eruptions to the Westward; but whether these arise merely from bituminous or other inflammable substances, or are actually volcanic,

I am unable to determine." These may possibly be the mere local action, but they are interesting as maintaining, the analogy between Nepaul and the other valleys of the lateral Himalayan Tract, where like phenomena have been found to prevail. Perhaps they may be similar in character to the burning ground of Cashmere.

E. Earthquakes of the Valley of Assam.

Although Earthquakes would seem to be by no means unusual occurrences in the valley of Assam, it is not until the year 1842 that any have been actually recorded; or if otherwise, notices of them have hitherto escaped me. Two shocks which may be traced to the valley, are noted in my Register for 1842, the first on the 23rd, the second on the 29th October, and these form the only primary shocks observed, the others by which the valley was affected during that year being evidently secondary ones, emanating from other points.

The indications of powerful volcanic action throughout Assam are numerous. The Kasyá Hills on the South-west, present some of the most remarkable phenomena of upheavement to be found perhaps in the world: coal is found elevated to a height of 4,300 feet above the level of the sea, on the summit of a mountain at Chirra Poonjee, accompanied by a series of rocks precisely similar to those associated with the coal at the base of the same hill; at the same place, a fossil Beach was discovered by Dr. McClelland, the precise height of which I do not at this moment recollect, but think it was about 1,500, or 2,000 feet; igneous rocks are so largely distributed in such positions, as to indicate their having been the causes of the upheavements in question. In the Naga Hills on the South and South-east, hot springs occur, the temperature of one of which was found to be $110\frac{1}{2}^{\circ}$ by Lieutenant Bigge, (J. A. S. Vol. X. p. 132); throughout the valley similar springs with others of petroleum and naphtha are numerous, all indicating a tract where volcanic forces are now in operation, and whence Earthquakes may consequently be expected to emanate. I am not acquainted with the physical structure of the Singhpo and Mishmee Hills on the Eastward, but I have little doubt similar volcanic indications would be found there as elsewhere, as from this quarter it is the impression throughout the province, shocks most commonly proceed.*

The record of the Earthquakes of the lateral Himalayan Tract is now completed, and in order to exhibit a general view of the whole, I have compiled the following Table:—

* I regret much that the following details of Earthquakes in Assam, should not have reached me in time to be included in the body of this memoir. I am indebted for them to Major Jenkins, Governor General's Agent in Assam, Mr. Masters, and to Mr. Piddington, by whom a copy of Capt. Hannay's memorandum was forwarded to me. I have combined the whole of the materials received, and formed from them a general list of Assam Earthquakes, omitting those however of 1843, as the Register for that year is not yet prepared.

The earliest is recorded by Capt. Hannay as having occurred on the 14th January 1839. It was felt at Suddeah, and its direction was, so far as could be ascertained, from S. W. to N. E. Some days of heavy rain in the valley, and snow in the mountains, preceded it.

3d June, 1839.—An Earthquake experienced at Suddeah on this date, apparently from South to North. Severe storms with a N. E. wind. Burrampooter high, and the weather



Tabular view of the Earthquakes of the lateral Himalayan Tract.

| Focal Districts. | Number of Earthquakes. | Date of Earthquake. | Remarks. |
|---|------------------------|-----------------------------|---|
| <i>A. Valley of Cabool.</i> | | | |
| | 1 | A. D. 1505, | Very severe, affected the whole of Aff-ghanistan. |
| | 2 | " 1829, | Severe. |
| | 3 | " 1836, | Several shocks experienced by Mr. Vigne, all slight. |
| | 4 | 14th Dec. 37, | Three shocks noted by Sir A. Burnes, slight. |
| <i>B. Valley of Jellalabad.</i> | | | |
| <p>From February to June 1842, not less than 200 shocks in all, must have been experienced throughout the valley, in which Earthquakes have long been common occurrences, especially during the cold weather.</p> | 5 | 19th Feb. 42, | Very severe, affected the whole line of the valley of the Cabool River, the plains of the Punjaub, and a portion of the N. W. Provinces of India. |
| | 6 | 22d Feb. 42, | Shocks all night and day with little intermission. |
| | 7 | 23d Ditto, | Ditto ditto, some severe. |
| | 8 | 24th Ditto, | A few shocks, gentle. Earth in a tremulous state. |
| | 9 | 3rd Mar. 42, | Several shocks, smart. |
| | 10 | 20th Ap. 42, | Severe, preceded by heavy rain and high temperature. |
| | 11 | 4th June 42, | Slight. |
| | 12 | 10th Ditto, | Smart. |
| | 13 | 29th Ditto, | Slight. |
| | 14 | A. D. 1552, | |
| <i>C. Valley of Cashmere.</i> | | | |
| <p>During the Earthquake of 1828, if all the shocks are taken into account their number must have exceeded 10,000!!</p> | 15 | " 1780, | Severe. |
| | 16 | 6th June 1828, | Very severe for two months, afterwards shocks to the amount of nearly 200 daily were experienced. The cessation of shocks followed by Cholera. |
| | 17 | " 1831-32, | ? Shocks said to have continued for six months. Recorded by Sir A. Burnes from native information. This cessation is probably the same as the preceding, a mistake as to time having been made. |
| | 18 | A. D. 1830, | ? Very severe. Recorded in the Sacred Books of the Nepaulese Brahmins. |
| <i>D. Valley of Nepaul.</i> | | | |
| <p>N. B.—The minor shocks of the lateral Himalayan Tracts have been continued for so many ages, that any attempt to approximate to their total number would be useless: yet the number of distinct shocks indicated in the above Table cannot be estimated at less than about 12 or 15,000!</p> | 19 | " 1829 | Smart shocks daily for 40 days. |
| | 20 | 26th Aug. 33 | Very severe. Affected a large portion of the Himalayas and the Plains of India from Delhi to the Bay of Bengal. |
| | 21 | From Aug. to November 1833. | Thirty-six shocks from 27th August to 26th November. |
| | 57 | | |

weather wet and disagreeable. Capt. Hannay remarks, that from March to June, the season was unusually rainy, and that although he does not distinctly recollect the periods, four shocks of Earthquake were felt at Suddeah in 1839.

14th January, 1840.—At 6 A. M. on this day, two shocks were experienced by Mr. Masters at Nazera (?) in Upper Assam.

3d February, 1840.—Another felt by the same observer, at the same place.

4th March 1840.

3.—*Earthquakes of the Tract of the Solimaun Mountains.*

This tract cannot yet be considered as well established, since I have found but one Earthquake that can be referred to it, and this not with perfect confidence. The shock occurred in 1831, and was very severe.* It extended from Peshawur to Dhera Ghazee Khan, but the point of greatest force was in the vicinity of the village of Derabund, on the Eastern slope or side of the Solimaun range. Near this spot it is said, that water appeared from crevices formed in the plain: men and camels were unable to stand from the violence of the undulations, and fragments of rock fell in many places among the mountains.

Very little information connected with the physical structure of the Solimaun range has come under my notice, and I am unable to say whether the usual indications of volcanic action exist there or not. Mr. Vigne mentions, (*Travels in Afghanistan*, p. 61,) his having procured from the interior of the mountains, specimens of a substance which on analysis appeared to be naptha with bituminous matter in solution. It oozes through the ground in various parts, and as it is a very common product of volcanic regions, it may indicate in the present case, volcanic action in some portions at least of the Solimaun mountains.

4.—*Earthquakes of the Tract of the Aravulli Mountains.*

It is only to the Northern portion of the Aravulli range, extending from the latitude of Agra to that of Delhi, that Earthquakes can yet be traced. The earliest of which I have discovered any notice is that of the 15th July 1505, experienced at Agra, and recorded in Dow's *Ferishta*, (Vol. II, p. 75). With indications of oriental exaggeration it is there stated, that "the mountains shook on their broad bases, and every lofty building was levelled with the ground, some thousands being buried in the ruins." Making due allowance for the tendencies of native historians in general, and of *Ferishta* in particular, this shock still appears to have been a severe one, and it is remarkable, that it was

4th March, 1840.—A shock was felt this day by Capt. Hannay, shortly after a total Eclipse of the sun. He remarks, when the sun was obscured the air was unusually cold and disagreeable to the feelings, even to nausea: about an hour after the Eclipse passed away, i. e. about 1 P. M., a smart shock of an Earthquake, and about ten minutes afterwards another: both shocks appeared to have come from the South. The sky was cloudless, but the atmosphere hazy.

9th February, 1841.—An Earthquake at Gowhatty this day (or on the 11th). Capt. Hannay states, that it was different to those previously mentioned. It was accompanied by a low rumbling noise, was sharp and stunning, as if a blow had been struck under you: the others alluded to, appear to have more of a trembling or rocking motion.

12th October, 1841.—A slight shock recorded by Mr. Masters at Nazera. Time 6 A. M.

4th January, 1842.—A smart shock felt on this day at 7½ P. M., at Sibsagur. The weather gloomy, cold and threatening rain. Capt. Hannay is unable to specify the direction, but the motion was of the undulatory character.

4th February 1842.—At 8 A. M., a shock experienced at Nazera by Mr. Masters.

The other shocks of 1842 are duly noted in the Register for that year. Those for 1843 shall be given in due time.

Any remarks on these shocks will be given more appropriately hereafter, and I may now only express my obligations to the gentlemen who have so kindly forwarded their notes to me.

* Vigne's *Travels in Afghanistan*, vol. i, p. 58.

during this same year that the Earthquaking forces were so fatally active throughout Affghanistan, as described in a former page.

The next Earthquake in order of time, which is referrible to the Aravulli tract is that of *July*, (day not ascertained,) 1720, experienced at Delhi. It occurred in the reign of Mahommed Shah, and during the troubles that prevailed while the two *Seiad* brothers, Abdullah Khan and Hosein Ali Khan, usurped the functions of the imperial Government. It is referred to only incidentally by Mr. Elphinstone in his History of India, (Vol. II, p. 586), while narrating the defeat, on several occasions, of the imperial troops by those of Asof Jáh, the founder of the sovereignty of the Nizams of the Deccan. "These events," Mr. Elphinstone remarks, "threw the *Seiads* into consternation, and though secretly agreeable to the emperor and many of the nobility, filled the minds of reflecting men with dismal forebodings of the ruin of the Empire. This gloom was rendered deeper among a superstitious people by a violent Earthquake which occurred about this time, and seemed to threaten the existence of the capital: and in these depressing circumstances, the brothers betrayed those signs of irresolution which are often the fore-runners of great calamities." There is now pointed out in Delhi a mosque, one of the minars of which, (still unrepaired,) is traditionally said to have been thrown down by an Earthquake which occurred in the early part of last century, possibly by that now under notice. Mr. Elphinstone also mentions, that the beautiful column, called the Cuttub Minar, situated about 12 miles from modern Delhi, lost its upper portion from the effects of an Earthquake, but no clue to the date of this accident is given. (Elphin. Hist. Vol. II, p. 9).

An interval of upwards of a century now intervenes ere another Earthquake in this tract is recorded; and relative to those which follow, the general remark may be made, that their intensity is very much inferior to those just noticed. They are far too slight to have even produced any effect on buildings of masonry, and have been almost universally nothing more than slight undulations of the earth, accompanied by noises. They could produce neither the moral nor physical effects attributed to the shocks of 1505 and 1720, and it would therefore appear, that since the last mentioned date, the disturbing forces have materially decreased in violence.

Earthquake of the 24th October, 1831.—This Earthquake was experienced near Delhi, and is described in the following letter published in the "Gleanings of Science," (Vol. III. p. 388.):—

To the Editor of the "Gleanings of Science."

Near Delhi, 24th October, 1831.

SIR,—I beg leave to send you a short account of a smart shock of Earthquake which occurred in my neighbourhood on the 24th October at half-past noon. I am encamped in North latitude $28^{\circ} 34'$ and longitude $78^{\circ} 04' 26''$ East from Greenwich. The wind was West from which quarter it had been blowing steadily for some days, but just previous

to the Earthquake, was in strong gusts. The horizon was hazy, but there were no clouds, and no noise was heard: the motion was apparently perpendicular, and if any thing from the North to the South. It continued for a full minute, and was the most severe many persons say, they ever felt. Books moved from their places on the table, the tent was literally shaken, and the mangoe trees appeared as violently agitated as if a branch had been seized and shaken for the purpose of throwing off the fruit: a palanquin in the tent moved, and it was with difficulty we could stand on the ground. My bearer actually laid hold of the *kanât* of the tent, and every one became sick, as if he had been at sea: but the most extraordinary circumstance is, that though the Earthquake was equally strong and perceptibly felt to the Southward, none of my parties who were detached to the Northward three or four miles felt it. The shock was so strong and continued, that I sent to a village, distant about a quarter of a mile, to know if any accident had happened, and was informed, that although the people were much alarmed, no damage was sustained. * * * * *

B.

P.S.—Since writing the above, I have heard that at a large village called Khanpûr, three miles South-west of this, the people ran out of their houses for fear of their tumbling down, and some stones fell from the Northern gate.

The observer in this case was situated considerably to the Westward of Delhi, and judging from the circumstances detailed, near to the Northern limit of the shock. Southward from the position the intensity was greater, but the Southern limit is undefined. From other evidence I have stated my conviction to be, that the local Delhi shocks have their focus in the Aravulli mountains, about twenty or thirty miles South-west of that city, and the details connected with the present shock, lead me to believe it emanated from the same locality. The line of greatest intensity would then be to the Southward of the observer, as it actually was, and although the direction of the motion seemed to be from North to South, while it ought, on the above supposition, to be from South-west to North-east, yet as the observer writes with hesitation on this point, he may very possibly have been mistaken. My own opinion certainly is, that the Earthquake of the 24th October 1831, emanated from the Aravulli range, and was a primary, although a local, and by no means, a widely extended shock.

For upwards of ten years another blank occurs, during which, no Earthquakes of the Aravulli tract are recorded. During the year 1842, no less than eight were experienced, as noted in Part I of this Memoir, so that the disturbing forces must have been unusually active in that year, unless their previous inactivity may be due only to our want of information on the subject, a circumstance by no means improbable. As I have noted all details relative to the shocks of 1842 in the Register, I need only recapitulate their dates here, combining with them, the others of the tract, so as to give the whole at one view:—

Tabular view of the Earthquakes of the Aravulli Tract.

| Focal Tract. | Number of Earthquakes. | Date of Earthquake. | Remarks. |
|--|------------------------|----------------------|------------------------------------|
| Aravulli Moun- tains, from about 27° to about 28½° North la- titude. | 1 | 15th July, 1505, | Very severe. Experienced at Agra. |
| | 2 | Ditto, 1720, | Very severe. Experienced at Delhi. |
| | 3 | 24th Oct. 1831, | Smart. |
| | 4 | 4th Jan. . . 1842, | Slight. |
| | 5 | Ditto, | Ditto. |
| | 6 | 4th July, . . ? | Ditto. |
| | 7 | 25th Ditto, . . | Ditto. |
| | 8 | 26th Sept. . . | Ditto. |
| | 9 | 27th Ditto, . . | Ditto. |
| | 10 | 6th Nov. . . . | Ditto. |

I have already mentioned in Part I, that indications of active volcanic forces are found in that portion of the Aravulli Hills now under notice; but our information relative to the general structure of the range is as yet very meagre, so much so, as not to warrant me in dwelling on the subject, and I therefore pass on to narrate the Earthquakes of the next tract.

5.—Earthquakes of the Delta of the Indus.

From the numerous volcanic phenomena presented throughout the tracts of country bordering on, and forming the Delta of the Indus, the frequent occurrence of Earthquake shocks might have been anticipated, but it is not until the year 1819 that any have been recorded, so far as I have yet ascertained. The various circumstances attending the great shock of the 16th June 1819, have already been ably brought before the scientific public by different authors, and a careful analysis of the whole has been made by Mr. Lyell in his "Principles of Geology, Chapter XIV." Since it is my object to present in this memoir a complete view of Indian Earthquakes, in so far as existing information will permit, it is necessary that I should repeat the accounts already given, and it is my intention to do so, in as full detail as the various published notices will admit of.

We have no accounts of the effects of this Earthquake at any point farther Westward than in the province of Cutch, although from its violence, it is probable, that it extended to Sind and Mekran. Commencing however with Cutch, its course will be traced Eastward, and its effects at various spots detailed.

Cutch.—The greatest force of the Earthquake under notice, appears certainly to have been exerted within the province of Cutch. Nearly every town and fort in it were seriously injured, many levelled with the ground, and among their ruins numerous lives were lost. The first and greatest shock occurred at a few minutes before 7 p. m. on the 16th June, but shocks of inferior violence continued until the 20th, when the volcano called *Denodur*, situated thirty miles North-west

from Bhooj, the capital of Cutch, burst into action, and the movements of the earth immediately stopped.

The effects of the shock in the Western portion of the province were remarkable and severe. An extensive subsidence of the Delta of the Indus took place, which is thus described by Mr. Lyell, on the authority of Captain Macmurdo: "Although the ruin of towns was great, the face of nature in the inland country was, not visibly altered. In the hills, some large masses only of rock and soil were detached from the precipices: but the Eastern and almost deserted channel of the Indus, which bounds the province of Cutch, (on the Westward,) was greatly changed. The estuary or inlet of the sea was before the Earthquake, fordable at Luckput, being only about a foot deep when the tide was at ebb, and at flood tide never more than six feet; but it was deepened at the fort of Luckput after the shock to more than eighteen feet at low water. On sounding other parts of the channel it was found, that where previously the depth of water at flood never exceeded one or two feet, it had become from four to ten feet deep. By these and other remarkable changes of level, a part of the inland navigation of that country, which had been closed for centuries, became again practicable." In describing the effects of the shock in this neighbourhood, Captain Burnes remarks: (Travels, Vol. I. p. 311.) "Wells and rivulets without number changed from fresh to salt water: but these were trifling alterations compared with those which took place in the Eastern branch of the Indus and the adjacent country. At sun-set, the shock was felt at Sindree, the station at which the Cutch government levied their customs, situated on the high road from Cutch to Sind, and on the banks of what had once been the Eastern branch of the Indus. The little brick fort of 150 feet square, which had been built there for the protection of merchandise, was overwhelmed by an inundating torrent of water from the ocean, which spread on every side, and in the course of a few hours converted the tract, which before had been hard and dry, into an inland lake, which extended sixteen miles on either side of Sindree. The houses within the walls filled with water, and eight years afterwards, I found fish in the pools of water among them. The only dry spot was where the bricks had fallen upon one another. One of the four towers only remained, and the Custom House Officers had saved their lives by ascending it, and were eventually transported to dry land by boats on the following day."

"But it was soon discovered," Captain Burnes continues, "that this was not the only alteration in this memorable convulsion of nature: as the inhabitants of Sindree observed at a distance of five miles Northward, a mound of earth or sand, in a place where the soil was previously low and level. It extended East and West for a considerable distance, and passed immediately across the channel of the Indus, separating as it were for ever, the Phurraun river from the sea. The natives called this mound by the name of "Ullah Bund," or the Mound of God, in allusion to its not being like the other dams of the Indus, a work of man, but a dam thrown up by nature."

This remarkable bund was cut through by a great inundation of the Indus, and from the section thus exposed, it was found to be composed of clay and shells. "To the eye," Captain Burnes remarks, "it did not appear more elevated in one place than another, and could be traced East and West as far as it could reach: the natives assigned to it a total length of 50 miles. It must not, however, be supposed to be a narrow strip like an artificial dam, as it extends inland to Raomoka Bazaar, perhaps to a breadth of sixteen miles, and appeared to be a great upheaving of nature. Its surface was covered with saline soil, and I have already stated, that it consisted of clay, sand and shells."

Thus at the Western extremity of Cutch, the effect of the Earthquake of 1819 was to produce simultaneously an elevation of a tract of country, fifty miles in length, sixteen miles in breadth, and ten feet in height, and a depression of another tract extending over about 2,000 square miles, which latter became an inland lake or lagoon. The depth of the channel of the river was variously affected, at some spots becoming greater, at others less, but all indicating material changes of level throughout the tract.

Runn of Cutch.—This remarkable tract of country extends from the Indus to the Western confines of Gujerat, having a total superficial extent of about 7,000 square miles. During the Earthquake, numerous jets of black muddy water were thrown out from fissures throughout this region, and cones of sand, six and eight feet high, similar in character to those observed during the Chilian and Italian Earthquakes, were thrown up. It is traditionally reported, that the Runn of Cutch was formerly an inland sea, freely accessible from the main ocean; that an extensive commerce was carried on along its shores; and that many towns, now far inland, formed its harbours. Nerona, a village about twenty miles N. N. W. from Bhooj and Chanu westward of Nerona, are both said to have been sea-ports. The people of Puchum, the largest island in the Runn, have traditions of boats having been wrecked on the hills of the island, and they point out several considerable harbours, called Dorut, Doh, or Dohce and Phungwuro, to the westward of Puchum. On the Sinde, or western side of the Runn, like traditions prevail. In farther confirmation of these traditionary accounts, it was observed, that during the shock of 1819, numerous pieces of iron and ship nails were thrown up with the black muddy water near Phungwuro, and like materials have subsequently been discovered in digging tanks in the neighbourhood. The traditions of the inhabitants of Cutch indicate the cause of this change of sea to land to have been some great natural convulsion, and they have, as is usual among a superstitious people, connected the occurrence with a mythological legend. A Hindoo saint, by name Dhoornath, a Jogee, (Burnes' Travels, Vol. I. p. 319), underwent penance by standing on his head for twelve years on the summit of Denodur, one of the highest hills in Cutch, overlooking the Runn. At the close of his penance God appeared to him, the hill on which he stood split in two, and the present Runn dried up, the ships and boats then navigating

its waters were overturned, its harbours destroyed, and the existing waste of land substituted for the pre-existing waters. It is thus that barbarous nations preserve the memories of great physical events, while they are incompetent to form any written record of their occurrence; and in such traditions, although interwoven with circumstances sometimes impossible, sometimes absurd, there is usually a substratum of actual truth. In the present case, "considering the frequent occurrence of Earthquakes in Cutch, the volcanic appearance of the hills and lava which covers the face of the country," there can be but little doubt, that a great alteration of level took place throughout the Runn, in consequence of some great convulsion, the existence of which is indicated only by the legends above referred to.

Bhooj.—Lat. $23^{\circ} 15' N$, long. $62^{\circ} 59' E$. At Bhooj, the capital of Cutch, the destructive effects of the Earthquake of 1819, were very great. They are thus described by Prof. Jameson, (*History of India*, Cab. Library, Vol. III. p. 270.) "The first and greatest shock took place on the 16th June 1819, a few minutes before 7 P. M. The wretched inhabitants of Bhooj were seen flying in all directions to escape from their falling habitations. A heavy appalling noise, the violent undulatory motion of the ground, the crash of the buildings, and the dismay and terror which appeared in every countenance, produced a fearful sensation beyond description. The shock lasted from two to three minutes, in which short period, the city of Bhooj was almost levelled to the ground. The walls, from the sandy nature of the stone, were crumbled into dust; nearly all the towers and gateways were demolished; and the houses left standing were so shattered, as to be uninhabitable. It was calculated that nearly 2,000 persons perished at Bhooj alone." "In the British camp, which was pitched in a plain between the fort and city of Bhooj, the general feeling was an unpleasant giddiness of the head and sickness of stomach, from the heaving of the ground; and during the time the shock lasted, some sat down instinctively, and others threw themselves on the ground. Those who were on horseback, were obliged to dismount; the earth shook so violently, that the horses could with difficulty keep their feet; and the riders, when on the ground, were scarcely able to stand."

Ahmedabad—Lat. $23^{\circ} 1' N$, long. $72^{\circ} 42' E$. At this city, the chief town of Gujerat, the shock was very severely felt. The following description of its effects is given in the work above quoted: "This city is justly celebrated for its beautiful buildings of stone and other materials, and for the famous shaking minarets which were admired by every stranger. Alas! the devastation caused by this commotion of the earth is truly lamentable. The proud spires of the great mosque erected by Sultan Ahmed, which have stood nearly 450 years, have tumbled to the ground within a few yards of the spot where they once reared their heads. Another mosque of elegant structure which lies to the left of the road leading to Shahee Bagh, has shared the same fate. The magnificent towers, which formed the grand entrance into the

citadel have been much shaken, and cracked in several places. The fort and town of Jelesheer are reduced to ruins. Many of the people killed were already out of doors, which is usually considered a situation of comparative safety. A marriage was about to be celebrated in a rich man's family, and the castes had assembled from various different quarters: the shock occurred when they were feasting in the streets, and upwards of 500 of the party were killed among the ruins of the falling houses." "All the disagreeable sensations were experienced of being tossed in a ship at sea in a swell, and the rocking was so great, that every moment we expected the earth to open under our feet."

Surat.—Lat. $21^{\circ} 11' N.$, long. $73^{\circ} 7' E.$ The Earthquake at Surat is thus described by an eye-witness: "The vibration of the couch on which I was lying was so great, that I was glad to get off it; the house was considerably agitated, the furniture all in motion; a small table close to me kept striking the wall, and the lamps swung violently. I ran down-stairs, and got out of my house as fast as possible. On getting outside I found a number of people collected, gazing with astonishment at my house, which stands alone, and was so violently agitated, that I expected it to fall down. The earth was convulsed under our feet."

Bâroach.—Lat. $21^{\circ} 46' N.$, long. $73^{\circ} 14' E.$ At this place the violence of the shock was very considerable. "Such of the houses as are elevated," says an observer who was on the spot, "and at all loosely built, creaked like the mast and rigging of a ship in a gale: ventilators and window frames rattling violently and the buildings threatening immediately to fall: a considerable lateral motion was impressed on every thing that admitted of it. After this, more violent concussion had lasted a minute or upwards, it was succeeded by an oscillatory motion, of a more equable character, which continued for more than a minute and a half, making the whole period of the convulsion nearer three than two and a half minutes."*

* I am indebted to H. Piddington, Esq. for the following additional details of the great Earthquake of June 1819. In common with other interesting communications previously alluded to, it arrived too late to be inserted in the body of my paper, and I am accordingly constrained to give it in this form:—

Extract from the Asiatic Journal, Vol. IX, 1820, p. 164.

Observations made at Porebunder, (lat. $21^{\circ} 39' N.$, long. $69^{\circ} 45' E.$) Since the 17th of June 1819, regarding the Earthquake.

It is necessary to state that these notes of the subsequent phenomena, were communicated in a letter to a literary friend in India, which will account for the familiar style of the remarks and the local allusions.

18th June.—Thermometer at 2 P. M. 90° ; wind light at S. W. Large electric clouds approaching from all quarters: vegetation much advanced. Neither shock nor tremors in the Earth, but in the person, a giddy and slight sickish or faint feel with pains in the knees, and an inclination to lie down on the earth rather than sit or stand, and cannot apply myself to any thing. These feelings appear to be general.

19th.—Thermometer at 2 P. M. 90° , cloudy; wind light S. W. by S. A tremor in the Earth at midnight, but of too short duration to allow of quitting the bed. The same unpleasant personal feelings all day and night as on the 18th: feel relieved by lying down, particularly on the earth.

20th.—Thermometer at 2 P. M. 90° ; wind S. W. A sensible tremor at noon: repeated at 50 minutes afterwards. The same disagreeable feel as on the 18th.

21st.—Thermometer at 2 P. M. 90° ; slight breeze at S. W. by S. Felt a continued tremor of the earth at midnight while in bed: removed from bed and slept in the open air, lest other shocks should bring down a shaken house.

22nd.

The extreme eastern limit of the Earthquake of 1819, appears to have been Poonah, where its force was only very feebly experienced. The tract affected therefore extends, so far as existing information shows, from about the meridian of 69° to that of 74° East longitude, and from about 18° to 24° North latitude. These limits are, however, by no means well ascertained, especially to the westward of Cutch, and also to the northward; our information from both of these directions being deficient.

22nd.—Thermometer at 2 P. M. 88° ; wind West. Weather changed to a gloomy, cloudy appearance, with indications of rain. Less tremor of the earth, but a consciousness that I am rather in a long rocking motion than standing firm; when I walk I do not think I go strait. The same unpleasant sensation as on the 18th, though in a less degree: from this and the change in the weather, entertain hopes that the tremors are ceasing, and that we shall soon be quit of our alarms and unpleasant feelings.

23rd.—Thermometer at 2 P. M. 82° ; wind S. S. W. Our first rains set in strongly at 12 last night, with the change of the moon: there were three tremors of the earth, but to-day our personal disagreeable sensations have abated, and we trust and hope that with the change of season, all physical effects of the Earthquake are leaving us for ever.

24th.—Thermometer at 2 P. M. 82° ; wind high S. S. W. Rough monsoon weather; much rain. Notwithstanding our hopes of yesterday, we were again alarmed last night between 12 and 1 o'clock, not by a tremor but by a shock, which awakening us, caused us to jump out of our beds and run into the open air, where we remained an hour. The shock lasted about two seconds. Immediately after it, observed a long narrow black cloud, running west and east, or quite the reverse way to what I am accustomed to see a line of cloud extend: it appeared stationary for half an hour, during which period there were constant tremors in the earth. Some houses in the town were thrown down. Our knees ached for half an hour after the shock: but on the whole we are much relieved from the disagreeable sensations of lassitude, giddiness and faintishness which we have constantly experienced since the great shock of the 16th. I attribute the sickish feel to the rocking motion we were constantly subject to. We were confident that the earth was in a long rocking or rolling motion, though we could not observe it.

25th.—Thermometer at 2 P. M. 82° ; wind light at S. S. W. no rain. There was neither shock nor tremor last night. I never experienced so charming a star-light night. I was up at 12, expecting a shock, and found the heavens so clear, and the stars so numerous and bright, that I was inclined to imagine, the Earthquake had swept the atmosphere of all its impurities. At present we are quite free from our late unpleasant feelings, and as the springs will be over to-day, so do I trust will all future shocks and tremors of the earth. At 2 P. M. heard at a considerable distance, in an easterly direction, about eight distinct sounds, like the discharge of cannon. I expect to hear of the bursting of one or more volcanoes in that direction. This being the end of the springs, though I know not that they influence Earthquakes, yet I think it probable they do, and hence imagine that the disorder in the bowels of the Earth, arriving with the springs, at a crisis, will cease with the discharge it has found for its foul air, and that now, you as well as ourselves, will be left at rest and hear no more of Earthquakes.

But a remark or two before I bid adieu. Certainly the commencement of the late phenomena had no connection with the springs, neither has that of a fever in the human frame, yet its crisis is always affected and frequently determined by them (?). I allude to the effects of the springs on fevers, beneath the tropic in particular, where the sameness of the atmosphere, causes them to act with greater influence on all physical matter than beneath more variable latitudes. The late phenomena has brought to my recollection, my having observed to an Officer of the Marine about the beginning of March last, that "there was a cloud in the North-east, which appeared uncommonly charged with electric matter." Its direction was nearly opposite to the one from which I heard the sound that preceded the great shock of the 16th. I have observed that previous to the approach of the S. W. monsoon, the electric clouds first appear in the N. E. on the opposite direction to that of the monsoon. Earthquakes are said almost always to be preceded by great droughts, but not so with that of the 16th. It was preceded by the usual hot season, but not by any uncommon drought. You will recollect, that in 1812 we had an uncommon drought in this country, so that many thousand of the inhabitants died for want of food, and the cattle for grass; but it

Indications of active volcanic action are very numerous throughout the Delta of the Indus, and indeed along the entire range of the coast of the Arabian Gulf. Hot springs are numerous among the mountains which fringe the Delta, and to the eastward volcanic phenomena are remarkably developed. I am indebted to an interesting paper on the country between Kurachee and Hinglaj, by Captain Hart, 2nd Bombay Grenadiers, for the following account of a singular series of mud volcanoes in a low range of hills to the eastward of the greater Hara mountains: "Six miles beyond the Phor river," Captain Hart remarks, "we came to the Tilookpoore wells, at present covered with an extensive marsh of fresh water formed by the late rain. One coss from them, in a westerly direction, three hills of extremely light coloured earth rise abruptly from the plain. That in the centre is about four hundred feet in length, of a conical form, with the apex flattened and discoloured: its southern and western faces rather precipitous, and with a more gradual slope on the others. It is connected with a

was not followed by an Earthquake! I have observed that the tremors and shocks have invariably been most constant and strong at 10 A. M. at noon, and at midnight. There has been no occurrence worthy of observation since the 25th, and as this is now the 30th, my conjecture of the former date has been so far correct, that the principal effects of the Earthquake did subside with the springs. The sensations felt since the 25th have been so slight, that were it not for their being somewhat generally acknowledged, they might be taken for the effects of the imagination."

The personal sensations alluded to above as felt before and during the Earthquake shocks, are identical in character with those invariably experienced by the writer before and during a thunder-storm. The same lassitude, feeling of sickness, and oppression are felt by me when the air is unusually charged with electric matter. I note the circumstance, because it is one of several, which indicate a connection between Earthquakes and the electric condition of the atmosphere.

The following observations would lead to a material extension of the extreme limits of the shock of June, 1819, since they prove that its influence extended even beyond the Ganges, affecting the whole of the country between that River and the Indus:—

Extract from the Asiatic Journal, Vol. IX. p. 184.

Muttra.—June 19th 1819. We had a smart shock of Earthquake here on the evening of the 16th, between 7 and 8 o'clock, which lasted I should imagine about 30 or 40 seconds.

Chunar and Mirzapore.—About 8 o'clock in the evening of the 16th June, the shock of an Earthquake was experienced at these places. At Chunar the motion was accompanied by a noise in the atmosphere, which resembled that occasioned by the rapid flight of birds.

Mynpooree.—June 20. On the evening of the 16th, we had a slight shock of an Earthquake: the undulating motion continued little more than a minute, and seemed to come from the West. It was felt very nearly at the same time at Futteyghur, and at one of my police chokees across the Jumna.

Jounpoor.—A strong shock of an Earthquake was felt here on the night of the 16th of June, at a quarter past eight o'clock: there were three distinct vibrations from West to East, with the usual accompaniments of rattling wall-shades, swinging punkahs, which appeared to me about 25 seconds: the intervals were very distinct. It was not accompanied by the rumbling noise I have usually heard on such occasions, and which I have hitherto imagined to be the earth's vibration. Both the noise and motion must be separate effects of some unknown cause. The rains have not yet commenced and the weather has been unusually hot.

Sultanpore, Oude.—June 17. A severe and awful shock of an Earthquake was felt at this station last night at 17 minutes past eight, which lasted some time, and occasioned very considerable alarm. The bungalows actually rocked, particularly the Mess one of the 1st Bat. 19th Regt., in which the officers were at dinner at the time, and the huts of the soldiers were a good deal damaged. The heat for the last two or three days has been excessive, and not a drop of rain has yet fallen.

smaller one of the same form, but of not more than half its size, by a sort of causeway, some fifty paces in length. The third bears the appearance of a cone, having been depressed and broken, and covers a greater extent of ground than the others. All three towards their bases are indented by numerous cavities which reach far into the interior: their sides are streaked with channels, as if water had flowed from them. On ascending the summit of the highest one, I observed a basin of liquid mud, about one hundred paces in circumference, occupying its entire crest. Near the southern edge, at intervals of a quarter of a minute, a few small bubbles appeared on the surface: that part of the mass was then gently heaved up, and a jet of liquid mud, about a foot in diameter, rose to that height, accompanied by a slight bubbling noise. Another heave followed, and three jets rose; but the third time only two. They were not of a magnitude sufficient to disturb the whole surface, the mud of which at a distance from the eruption was of a thicker consistency than where it took place. The pathway round the edge was slippery and unsafe, from its being quite saturated with moisture, which gives the top a dark coloured appearance; on the southern side a channel, a few feet in breadth, was quite wet from the eruption having recently flowed down. I was told that every *Monday*, the jets rose with greater rapidity than at other times, and then only did any of the mass ooze out of the basin. The entire coating of the hill appears to be composed of this mud, baked by the sun to hardness. No stones are to be found on it, but near the base, I picked up a few pieces of quartz. Crossing the ridge which connects this hill with the least of the three, I climbed up its rather steep side. In height or compass it is not half the height of its neighbour, and its basin, which is full of the same liquid mud, cannot be more than five and twenty paces in diameter: the edge is so narrow and broken, that I did not attempt to walk round it. One jet only rose on its surface, but not more than an inch in height or breadth: but a very small portion of the mass was disturbed by its action, and although the plain below bore evident marks of having been once deluged to a short distance by its stream, no eruption had apparently taken place for some years. At times, the surface of this pool sinks almost to the level of the surface of the plain, at others it rises so as to overflow its basin: but generally, it remains in the quiescent state, in which I saw it: two years previous, it was many feet below the crest of the basin. On my way to the third hill, I passed over a flat of a few hundred yards, which divides it from the other two. The sides are much more furrowed by fissures than theirs are, although their depth is less: and its crest is more extended and irregular. On reaching the summit, a large circular cavity, some fifty yards in diameter is seen, in which are two distinct pools of unequal size, divided by a mound of earth, one containing the liquid mud, the other clear water. The surface of the former was slightly agitated by about a dozen small jets which bubbled up at intervals, but in the latter, only one was occasionally visible. A space of a few yards ex-

tended on three sides from the outer crust to the edge of the cavity, which was about 50 feet above the level of the pools: their sides are scarped and uneven. On descending the northern face, I remarked a small stream of clear water flowing from one of the fissures into the plain, which had evidently only been running a few hours: the mud water of all the pools is salt. A fourth pool situated close to the great range of Haras, and distant from the rest upward of six miles, was pointed out as having a similar cavity to this one. Its colour is the same, and although the surface is more rounded, its summit appears broken. I regretted not having an opportunity of visiting it. The name given to these singular productions of nature is the "Koops, or Basin of Raj Ram Chunder." They are said to be altogether eighteen in number, seven in this neighbourhood, and eleven between Kedje and Gimmadel in Muckran. Four were pointed out to me, and I was told the other three were hid among the mountains. Some persons with my party had seen one of those in Muckran, and had heard from the Beerooes who shewed them the road, that many others were spread over the country: he described it as throwing up jets similar to the large hill here. By the Hindoos, they are looked upon as the habitation of a deity; but the Mahommedans state, that they are affected by the tide, (the sea is not more than a mile distant from the large one,) but this I had reason to doubt, as of the many persons I questioned who had visited them at all times, not one remembered to have seen the pools quiescent, although several had been on the large hill when the mud was trickling over the side of the basin. To endeavour to ascertain this fact, I placed several dry clods of earth in the bed of the channel on a Saturday, as I expected to return by the same route on the following week. A range of low hills of irregular form lie to the westward of, and almost close to, the Chunder Koops. I had not time to examine them, but from their appearance, I judged they contained sulphur, and on questioning some of those with me who crossed them, they said the taste of the earth was like that near the hot springs of Sehwan where it is known to abound. A Hoomrea who was present, mentioned, that about six coss off, there was another hill called by the name of the "Sulphur Mountain."

Describing the valley of the Aghor or Hingool river, Captain Hart remarks: "The faces of the rocks towards the stream are broken and craggy. That on the left bank is higher, and more scarped than its opposite neighbour. Beyond them in the distance is seen a range of light coloured sand-hills, to all appearance nothing but a mass of conical-shaped peaks, and towering far above them, are the blue mountains of Hinglaj, precipitous and wild." "On ascending the left bank of the river, after passing between the peaks of the mountains, which seem as if they had been severed by some convulsion of nature, a full view is obtained of the sand-hills. They appear to consist of one irregular range, cut in two by the river, extending southward to near the sea, and northwards far into the mountains. They are from three to four hundred feet in height, covered from base to summit with num-

berless small conical-shaped, ribbed peaks, like that of the Chunder Koops, and their surface appears to have been baked to hardness by the sun." In this range of hills it is highly probable, that numerous mud volcanoes, similar to those already described by Captain Hart, would be found, and the entire tract is evidently the seat of active volcanic forces. The result of Captain Hart's experiment on the activity of the Chunder Koops is thus described: "On our way back, nine days after first seeing them, I again visited the Chunder Koops. The appearance of the one that was fallen in, was as sand in a muddy pool, and the water instead of being clear as before, was quite discoloured: the stream also had ceased flowing for some time, as the plains bore no marks of moisture. On reaching the summit of the larger one, it was very evident that an eruption had taken place the day before (Monday,) for the channel on the western side was quite filled with slime, which had oozed down the side of the hill, and ran some thirty yards into the plain below. The dry clods I had placed when before here were covered, and it was not safe to cross where the mud had found an issue, whereas my whole party had when with me, walked round the edge of the basin. The jets rose as usual. So tenacious is the mud of this one, that even cocoa-nuts which the Hindoos throw on it do not sink, but in the others it is more liquid. No alteration had taken place in the appearance of the small Koop."

From these interesting details, and from the fact that throughout the tract of country on both sides of the Indus near the sea, hot springs are disseminated; it appears that the usual characteristics of localities subject to Earthquake shocks are found in that now under notice. It is to be regretted that our information relative to the actual occurrence of Earthquakes here is so very limited; but the inhabitants of the country are unsuited for retaining and transmitting such observations, since even the great shock of 1819 was, as Captain Burnes informs us, early forgotten, and had intelligent European observers not been on the spot shortly afterwards, the event would probably never have been heard of, and the many interesting phenomena their labours have served to eliminate, would have been lost to science.

Captain Burnes informs us, that it is the general belief among the inhabitants of the province, that "the sea is receding from the southern shores of Cutch," or more correctly, as the sea-level continues unaltered, that there is now taking place a very slow and insensible elevation of the coast of Cutch, similar most probably in its nature to that in progress on the coasts of Sweden, the reality of which has been satisfactorily established by Mr. Lyell. This elevation would seem to be much more extensive than Captain Burnes was aware of, since, if native traditions are to be depended upon, a like process has taken place in the province of Lus,* on the same coast of the Arabian Gulf, but much farther to the westward: in the same tract of country indeed in which the mud volcanoes formerly described are said to

* Lieutenant Carless, I. N. Memoir on Lus, As. Soc. Jour. Vol. VIII, p. 154.

occur. No definitive information on this very interesting point has yet, however, been obtained, but the establishment of proper marks to which future reference could be made, would be an object worthy of the attention of the Officers just deputed to the survey of Sind; for on the coast of Sind as well as on that of Cutch and Lus, if the movement be a real one, indications of its existence would in time be furnished.

During the year 1842, an Earthquake was experienced at Baroda, but no account of its course was, so far as I am aware, made public. I have already expressed my regret at this, as the shock may possibly have emanated from the tract under notice, but as this cannot now be ascertained, it is unnecessary to allude farther to it.

6.—*Earthquakes of the Tract of the Vindhyan Mountains.*

The Vindhyan mountains extend in an almost unbroken chain from the Gulf of Cambay to the valley of the Ganges, thus traversing the entire peninsula of India at its base, and forming the connecting line of the mountain ranges of northern and southern Hindoostan. It is probable indeed, that at one period the Vindhya crossed the Gangetic valley, and being connected with what are now called the Garrow Mountains, abutted ultimately on the Himalayas. Throughout the whole of this extensive range, indications of volcanic action are developed in a most remarkable manner. This action, speaking comparatively with what it has been at a former epoch, may now be described as almost extinct; but there are still occasional proofs furnished of the forces once developed on so large a scale being yet in existence, although with much reduced intensity. The development of trap rocks in the central portion of the Vindhya is the most remarkable feature in their physical structure; the details of this have so frequently been given already, that it is unnecessary for me to do more than merely to allude to them here. Hot springs are also most abundant, and have been described by various observers, as extending from the valley of the Nerbudda to that of the Ganges. That Earthquakes should occasionally be experienced within a region so abundant in marks of igneous action was to be anticipated, and it is only remarkable, that the number recorded should be so few, and their intensity so feeble.

The earliest historical notice we have of a convulsion of this class is that relating to the destruction of the city of Oojein, (lat. $23^{\circ} 11' N.$, long. $75^{\circ} 35' E.$) by a shower of volcanic ashes, in the time of Rajah Vikramaditya, 56 B. C. Sixty other towns are said to have been involved in the same catastrophe, but it must be admitted that the tradition on which this statement is based is apocryphal, being unsupported by any physical evidence of volcanic action within the historical period in the vicinity of the place, so far as its examination has been carried. It seems, however, scarcely possible, that a volcano capable of ejecting a shower of ashes on so enormous a scale could have wholly escaped research, and in the present state of our information, the destruction of Oojein from igneous action must be held doubtful. Captain

Dangerfield states, that in the neighbouring Vindhya, and in the wild tract of Rajpeely, (Malcolm's Central India, Vol. II, p. 325), some hills are said to have hollows in their summits resembling extinct craters, but as he had never seen them, he could not hazard an opinion as to their true nature. In Malwa, where igneous rocks are almost universal, Earthquakes are said to be frequent, but no special instances are mentioned.

It is not until the year 1842, that the dates of any Earthquakes emanating from the Vindhya have been ascertained. The Earthquakes of the 21st and 23rd of May 1842, by which many places in the vicinity of the Rajmahal hills, the eastern termination of the Vindhya, were smartly affected, are decidedly referable to the tract now under notice. The direction of the shocks as noted in my Register, and their comparative intensity at different points varying in their distance from the hills establish the point. Since the publication of the Register for 1842, I have received a few farther details connected with the above mentioned Earthquakes which I may give here. For these I am indebted to the ever-active kindness of Mr. Piddington, Sub-Secretary, Asiatic Society, who forwarded to me the proof sheets of his Seventh Memoir on Storms, in which the details in question were given. This is only one of the many similar acts of kind assistance I have received from this gentleman, and my best acknowledgments are due to him.

Gya.—Lat. $24^{\circ} 49' N.$, long. $85^{\circ} E.$ Relative to the Earthquake of the 21st May, W. St. Quintin, Esq. C. S. writes as follows:—

21st May.—"At 20 minutes before 9 o'clock A. M. we had two smart shocks of Earthquake from West to East; for some days before and after this, the sky had a white, thick, hazy appearance. The heat of the weather was most oppressive. Thermometer never under 90° and often at 95° in the house, and 115° in the shade of the outside verandah."

Monghyr.—Lat. $25^{\circ} 23' N.$, long. $86^{\circ} 38' E.$ Mr. Palmer of Monghyr writes thus: "The whole of this season, I mean from January (1842,) has been rather a remarkable one, and very different from what I have observed at this station for the last seven years. The annual passing showers of January and February did not visit us. March and April, though generally one stream of strong N. W. and N. E. winds, approached us with somewhat less fury, and with a succession of a day or two intervening between the gusts. May was sultry in the day without the usual hot winds, but attended with a cooler feeling by midnight, until near the 19th, when the air became heavy and oppressive to a degree, and the sky had a peculiar hue about the time of sun setting. This continued until the morning of the 21st, and though we looked forward to some kind of coolness, or a light air about dawn, it was the reverse this morning: a lethargic sensation seemed to hang about until a quarter after nine, when the earth was observed to tremble and rock from East to West (from West to East?) for half a minute, vibrating

those wall shades only in that line, when as if a second shock, though I could perceive no stop, came from the direction of N. and S. affecting the wall shades again in that line: the last undulation appeared to be the strongest: this was repeated three times, each with less force. On the 23rd, two more slight shocks were felt, since which period up to the night of the 2nd of June, the sky assumed every evening an ashy colour, blended with tints of a salmony hue and very oppressively hot. A strange effect it appeared to have on all trees in either blossom or young fruit. As proof of this, the whole of the fruit in my garden was stunted in its size with a kind of harsh flavour, though free from any worm: the Blossoms falling off as if each leaf was partially baked to make it crisp."

About five miles from Monghyr is the Seetacond, a hot spring celebrated as a favourite resort of Hindoos. Its temperature is variable, sometimes rising as high as 136° , and sometimes being only 92° or 93° . It is a remarkable fact, that Monghyr seems to suffer more from Earthquake shocks, from whatever direction these may come, than any other place in its vicinity. This was observed during the shock from the lateral Himalayan tract, of the 26th August 1833, again during that of the 11th November 1842, and I would say from the information before me, that on the present occasion, the shocks were smarter at Monghyr than at any other spot. What the cause of this greater susceptibility may be, it is impossible at present to say, as it would be necessary to know the locality thoroughly, before any could be with propriety or confidence assigned, but the *fact* seems well established.

It would appear from the following remarks of Dr. Hamilton Buchanan, in a paper on the minerals of the Rajmahal hills, that towards the western extremity of this range, there are decided indications of igneous action.

"I have said," Dr. Buchanan remarks, "that Rangreswaritok at the western extremity of the range appears to me to have been the crater of a volcano. It is a conical hill about 300 feet in perpendicular height, and very steep on all sides. On reaching the summit, you find it consists of a great cavity surrounded by a thin ledge, and descending to very near the level of the plain. The ledge now is of unequal height, having in some places given way, especially towards the East, whence a gap about 30 yards wide at the bottom gives access from the outer plain with very little ascent, and allows the water from the cavity to escape. Towards the summit, the inner ledge consists of abrupt rocks, but the bottom is filled with the debris of the portions of the ledge that have fallen. Much slaggy matter is to be found on the outside of the hill and at the bottom of the cavity." "I was informed by Isfundyer Khan, a fine young man, assistant to the Sezawal who manages the hill tribes, that about five years ago he heard of a smoke that issued from a hill named Chapar Bhita, about seven coss S. E. from Karariya. He visited the place, which was not hollow, and

consisted as usual of earth mixed with a great many fragments of stone. In the day it was not luminous: but that a thin smoke issued continually from a space 8 or 10 cubits in diameter. He heard that at night it was luminous, but he did not see it in that state. On throwing wood on the hot place in a few minutes it took fire. These appearances continued for about three years and then stopped." Dr. Buchanan farther mentions that the whole tract of the Rajmahal Hills abounds with hot springs. (*Gleanings in Science*, Vol. III, p. 6.)

It is anticipating materials not yet properly arranged, but I may mention that other Earthquakes have occurred during the year 1843 referrible to the Vindhyan tract. These will be duly noticed in the Register for the present year, and it is only necessary to mention here, that one of them shews the continued action of the disturbing forces throughout those igneous districts of Central India, where once its intensity was displayed on so extensive a scale.

7. *Earthquakes of the Tracts of the Delta of the Ganges.*

The forces which have given origin to those Earthquakes which have from an early period been known to affect Calcutta and its vicinity, are probably to a certain extent connected with those of the tract next to be described, namely, that of the Arracan coast; but it is proved by several examples that the Earthquakes of the Delta may occur with entire independence of those on the coast, and I have therefore felt warranted in making the former a distinct focal locality.

The earliest notice of an Earthquake referrible to the Delta of the Ganges, that I have been able to find, is contained in the following extract from "The Gentleman's Magazine," printed in 1738-39. I am indebted to Major H. B. Henderson's Chronological Tables for the notice, which runs thus: "In the night between the 11th and 12th October 1737, there happened a furious hurricane at the mouth of the Ganges, which reached 60 leagues up the river. There was at the same time a violent Earthquake which threw down a great many houses along the river side: in Galgotta (*i. e.* Calcutta,) alone, a port belonging to the English, two hundred houses were thrown down, and the high and magnificent steeple of the English Church, sunk into the ground without breaking. It is computed that 20,000 ships, barks, sloops, boats, canoes, &c. have been cast away. Of nine English ships then in the Ganges, eight were lost, and most of the crews drowned. Barks of 60 tons were blown two leagues up into land over the tops of high trees: of four Dutch ships in the river, three were lost with their men and cargoes; 300,000 souls are said to have perished. The water rose forty feet higher than usual in the Ganges."—N. B. The steeple of the Church was described to have been lofty and magnificent, and as constituting before this period the chief ornament of the settlement."

No Earthquake of equal violence with this has ever since occurred, and it is the only one in which fissures in the earth to any extent have been observed. It is farther remarkable as having been accompanied by a terrific hurricane, a coincidence however by no means rare, and

to which attention will be more particularly directed at a subsequent time.

The next shock of which I have obtained intelligence, occurred at Calcutta in the month of April 1810. It is described in the following Extract from the Asiatic Annual Register, Vol. XII., kindly forwarded to me by Mr. Piddington.* "April 3d, on Sunday evening last, presently after the cessation of a smart north-wester, two successive shocks of an Earthquake were distinctly felt in many parts of Calcutta and its vicinity. The time of its occurrence, as noted by different persons, was between 20 and 25 minutes past 7 P. M., and the duration of each successive shock was variously estimated at from 6 to 30 seconds. The vibrations appeared at first to pass in a line from north-east to south-west, and then to return in an opposite direction. They were almost universally perceptible to those who were sitting at the time in the upper apartments of their houses, but were in a few instances, observed on the ground floors. At one house in Garden Reach, where a party of eleven were sitting at dinner, the shocks were very strongly felt by three of the number seated at one corner of the table, and also by the three others at the opposite corner, while they passed unobserved by the rest of the company. Besides the peculiar sensation experienced in their own persons by those who witnessed the pheno-

* With the above account of the Calcutta Earthquake of 1810, Mr. Piddington forwarded to me another of a shock experienced at *Matura* on the night between the 31st August and 1st September, 1803. I have found it impossible to identify to my own satisfaction the geographical position of the place called *Matura*. In the month of September 1803, the British Troops took possession of *Mathura*, a town in the province of Agra, (lat. $27^{\circ} 32' N.$, long. $77^{\circ} 37' E.$) and this may possibly be the place alluded to, in which case the Earthquake would be referrible to the Aravalli tract. From my uncertainty as to the position of *Matura*, I have given the account of the Earthquake in a note, instead of in the body of the memoir. From the style, the notice would appear to be a translation from a native account.

Extract from Asiatic Annual Register for 1804, Vol. VI.

Bengal Occurrences for October, 1803.

Matura, September 24th, 1803.

"On the night between the 31st August and the 1st of September, at half an hour after midnight, a severe shock of an Earthquake was felt at this place, which lasted for many minutes, and was violent beyond the memory of man. Probably not a living creature in the place but was roused from his slumbers by the alarm, and felt its effects. Many of the pukka (Masonry) buildings were cast down, and zenanahs hitherto unassailed by violence were deserted, and their fair inhabitants took refuge in the streets and in the fields in dishabilles which had no effect to conceal them, and in affright which elevated their charms, seeking protection with men whose visages it would otherwise have disgraced them to behold.

"In the morning very extensive fissures were observed in the fields, which had been caused by the percussion of the night before, through which water rose with great violence and continues to run to the present date, though the violence has gradually abated. This has been a great benefit to the neighbouring ryots, as they were thence enabled to draw the water over their parched fields.

"The principal mosque of the place erected on an eminence by the famous Ghauzi Khan as a token of his triumph over the infidelity of the Hindoos, has been shattered to pieces, and a considerable part of the dome was swallowed up during the opening of the earth.

"Several slighter shocks have since occurred, but I do not hear they have occasioned any farther damage."

menon, in many houses a very distinct motion was communicated to the oil in the wall-shades; the girandoles and lamps were seen to swing, and even the mirrors (such as were fastened at the upper extremity with a cord) were observed to vibrate towards the wall. In a room on the central floor of one of the turrets of the lower Orphan School at Howrah, (which is a very old and infirm building,) the force of the undulations was so considerable, that a couch on which a person happened to be reclining was moved on its castors at the first shock to the distance of nearly a foot from its original position close to the wall, and was again thrown back to its place by the returning succession. To some persons the vibration appeared to be accompanied by a noise which they describe as resembling the sound of muffled bells.

“Reports from various stations in the lower parts of Bengal, as far up as Moorshedabad, mention the occurrence of a similar phenomenon, nearly about the same hour. By a letter from Ramnagur, the vibration is stated to have been felt there at half-past seven, and to have continued for an unusually long time.”

No farther notice of Earthquakes in the Delta of the Ganges occurs until the year 1829, when on the 18th September, at a little past 7 A. M., two shocks which are described as having been “very strong,” were experienced at Calcutta. I have found only a very brief notice of these shocks, and beyond the fact, that the movement of the earth during their continuance was vertical, or “up and down,” I find nothing else of interest recorded.

Another long interval of quiescence occurs, and it is not until the 11th November 1842, that we have any other Earthquakes at Calcutta, or in its vicinity. On that day at nearly half-past 9 P. M., an Earthquake was experienced throughout the Delta of the Ganges, which from the published accounts would appear to have been the most severe felt within the previous twenty-five years. All particulars connected with this shock have been given in ample detail in the first part of this memoir, and I need not therefore dwell long upon it here. It was a shock evidently originating *within* the Gangetic Delta, not communicated from any other tract: it was felt very feebly indeed at the northern extremity of the Arracan region, and not at all, that I am aware of, at any of our stations along that coast: its intensity diminished perceptibly in its course from the vicinity of Calcutta, in all directions, and even had we no other grounds for establishing the Delta of the Ganges as an independent Earthquake tract, this shock alone would I think be sufficient to warrant our doing so. The point where the disturbing forces act is in the immediate vicinity of Calcutta, since it is there that the intensity of the recorded shocks has always been greatest. It is possible, however, that had we equally good intelligence from other localities in the Delta, it would appear that the vicinity of Calcutta was not the only centre of disturbance, and as observers and observations are multiplied, a wider range may perhaps be given to the forces in action.

The occurrence of Earthquakes is at present the only indication furnished of the existence of disturbing forces beneath the Delta, but if we may form a judgment from the results of the Boring operations in Fort William, such forces must at no distant period have acted with an intensity much greater than we have had any evidence of since we became acquainted with India. The section of the Delta furnished by these operations exhibits a series of strata alternately composed of coarse gravel and fine river sand, or lacustrine mud, accompanied by two remarkable deposits of carbonaceous matter, one near the lower, the other near the upper extremity of the section. The lowest stratum, attained at a depth of 392 feet from the present surface of the Delta, and continued to 480 feet, consists of coarse conglomerate composed of large rolled fragments of primary rocks. To this stratum, on grounds as plausible as the circumstances of the case will admit, Dr. McClelland has assigned an age of nearly 3,300 years. Since that epoch, therefore, all the subsequent changes of level in the Delta, so clearly intimated by the nature of its constituent, strata must have taken place, and as in the latest of these changes, a subsidence of the surface of the land to an extent of 75 feet in depth is indicated, it may reasonably be inferred, that a high intensity must have characterised the disturbing forces to which a change of such amount was due. Those who may wish to examine the points just alluded to in greater detail, are referred to my Memoir on the Structure of the Delta of the Ganges in No. 3 of Dr. McClelland's Journal, where all necessary information will be found.

8.—*Earthquakes of the Eastern Coast of the Bay of Bengal.*

In tracing the geographical limits of the various volcanic regions throughout the world, Mr. Lyell makes the great train of the Molaccus to terminate abruptly with Barren Island in the Bay of Bengal, (lat. 12° N.)* But the entire eastern coast of the Bay of Bengal, as far to the northward as Chittagong is essentially and prominently volcanic, and along the Arracan coast especially are the indications of igneous forces most distinct. To these I will subsequently refer more in detail, but at present I must proceed to notice the Earthquakes which have been experienced throughout this tract.

Our acquaintance with the Arracan tract is comparatively speaking, so recent, that the evidence of the frequent occurrence of Earthquakes throughout it, is chiefly traditional and physical, and it is not until the middle of the eighteenth century that we have the actual date of any such convulsion, strictly ascertained. On the 2nd of April 1762, however, a great shock occurred, affecting the whole of the eastern coast of the Bay of Bengal, and extending to some distance into the interior. The most ample details of the nature and effects of this shock were observed in the vicinity of Chittagong, and are recorded in

* In the map the sixth Edition of Mr. Lyell's work, which Lieut. Smith has evidently not seen, the volcanic band is very properly carried on to Chittagong.—EDS.

Vol. LII. of the Philosophical Transactions, from which the succeeding extracts have been taken.

"XXXIX.—An account of an Earthquake at Chittagong: translated from the Persian by Mr. Edward Gulston, and communicated by him to the Rev. Mr. Hirst. Read, 17th November, 1763.

Reverend Sir,—The following was written by a Persian writer, pursuant to an order from Harry Verelst, Esq., Chief of the Honorable East India Company's province of Chattigaon, in the kingdom of Bengal, and sent to Calcutta, for the information of Messrs. Vansittart, Hastings and others, acquainted with that language. As it is of indisputable authority, I have taken the pains to copy and translate it for your satisfaction, being, &c. &c.

Calcutta, November 1, 1762."

EDWARD GULSTON.

Account of an Earthquake which happened in the region of Islamabad on the 22d of the month *Chyte*, 1168, Bengal æra, (answering to the 2d of April 1762,) on Friday about 5 o'clock in the afternoon, which according to the best advices I have written and now send you.

Particulars are as follow :—

"The land of Mahommed Assad, Chowdry of the Pergunnah Dêeâng, at a place called Barreeah, is laid open by the shock from 10 to 12 cubits in width, and become as it were, a deep creek: the water rising up so, that the ground of the farmers inhabiting the place is 8 cubits overflowed.

"And at Deep in the Chowdraj of Mahommed Athyâr, the like hath come to pass.

"And Moktârâm Fowtahdar, dwelling at Goyparah, has written that to the North and East, his house was cracked, and water there spouted up like a fountain, and the ground also sinks every day by little and little.

"And by letter from Satos Mester, Darogah of the Salt-works at Bansbareeah, it so fell out that to the westward, Akl'poorah, an island of the salt-works was levelled with the water on its East side, and on the North and South the ground opened from 5 to 7 cubits in width, and sunk like a pit to the depth of 10 cubits, the water spouting up; nor is there the least appearance of its subsiding: we know not what will come of it.

And from the reports of the people there we hear, that these places were never before overflowed by the water, we cannot at present tell what misfortune has happened. However, all the Government's salt was before this laid up in store-houses. Moreover a mud building of your servants' (the writer of this account,) was almost destroyed by the shock; but it still stands upright.

And at Haldah, about 12 doon of land belonging to Sacheeram Cannoongoey, is entirely sunk into the water.

In like manner in Takaleah, about 5 doon of ground, the property of Barjallââl Chowdry, has fallen something below its primitive level.

And at ditto Hâzary, Harry Singh's house and a brick building of Shere Zaman Khan's came down, and the Khan was hurt by the fall of his: and there opened a cavity like a ditch of 200 cubits in length, which filled with water.

At Howlâ, the house of Shiam Ram, tax-gatherer, broke down, and his whole enclosure was torn up, and in most places his house and fish-ponds were filled with sand banks: even now the whole spot is two cubits under water.

And, at Dahrampoor, the house of Santeeram, the Cannoongoey's writer, entirely fell down.

The Katwall of Islamabad (Chittagong,) informed us with his own mouth, that in a place called Baramcharah, the water was up to a man's waist, and the people there have betaken themselves to flight through fear of perishing: no living creature but the cattle remaining.

And in the house of Santeeram Cannoongoey of Islamabad, a brick-ed room was ruined, and one of his brethren, named Rajah Ram, was killed by the fall of the bricks.

And the house of Nandaram coming down in the same manner, a son of his was knocked on the head.

And to the westward of Kadr Katcheah, a large hill, called Kad-daleah, very near Karn Phooly, was rent, and it stopped up the passage for boats in and out of that river. And at Bajabeah, Sangetty and ditto Hazary, creeks were closed up by banks of sand rising from their bottom. And at Gandarah Jowar, about three doon of land belonging to Mahommed Alli Chowdry, rent, and was swallowed up, and the passage in and out his house also cleaving asunder, the water rose up, and has flowed all round the house.

Moreover, the factory house, a strong building in the fort of Islamabad cracked from top to bottom and tumbled down, and an apartment newly built was also rent.

And to the eastward, a large pond of Bêlah Khan, became a deep gulf: and to the east also of Aghy Gunge, belonging to the city of Islamabad, the ground in different places clave asunder, water rising up as from so many springs.

And at Chebpayttlee, about 12 katy of land, belonging to Sâjûr Chowdry, was overflowed, and rendered unfit for tillage.

And from letter of Chehtarnarayn, surveyor of the lands, we learn, that the north side of the Chacklah Sowabeel, just by Haldah river, broke down, and is swallowed up by the river, and also four people were overwhelmed in its ruins.

And Mr. Griffith's brick house (in Islamabad) has been cracked, also the house and walls of Juan de Baris, a Portuguese here.

And from Nahal Charah there is news, that greater part of the ground of that island clave asunder, and is swallowed up by the waters, and hundreds of people perished with it. Besides this, the state of that island will be known to you from a Bengal account.

From the Jooms, whose country is about four days off from Islama-

had, we learn that Reang hill split in two, and sunk 40 cubits: also that Kachalang hill is even with the ground.

And Bahugoo Changu, a Joom hill, rent in twain, and is sunk 30 cubits, and the houses of most of the inhabitants in these parts thrown down.

And a Joom hill, Chahter Patterah, split by little and little, till it is almost level with the plain: and because of the opening of the hills and the destruction of the trees on them, the way by which the Jooms used to pass is stopped up.

And Bajaleeah, another Joom hill, opened 30 cubits, and sinking, water rose up: and Palanga Joom hill split and sunk 25 cubits.

The design of this is to lay before you the wonderful disorders that have come to pass in these regions, and which continue to happen, in so much, that since the time of Adam until now, in this place no one has heard of the like.

If I should describe them with a thousand instances and relations, and make mention of so many particulars, still there would not be a part in ten that I could bring within the compass of writing. But these few particulars I send for your Excellency's information.

Farther details of this great catastrophe are contained in the following communication from the Rev. Mr. Hirst, to the Rev. Thomas Birch, Secretary to the Royal Society, read November 17, 1763.

Calcutta, November 3, 1762.

REVEREND SIR,—To the enclosed accounts of the transit of Venus, I have subjoined others of an extraordinary Earthquake felt in this part of the world, which I flatter myself will not be unacceptable to the Royal Society.

The Earthquake happened the second day of April last, was very violent in the kingdom of Bengal, Arracan and Pegu; but especially at the metropolis of Arracan, where, according to the accounts of an English merchant residing there, the effects have been as fatal as at Lisbon, and where it is thought the chief force of the Earthquake vented itself. At Dacca, in this kingdom of Bengal, the consequences have been terrible; the rise of the waters in the river was very sudden, and so violent, that some hundreds of large country boats were driven ashore or lost, and great numbers of lives lost in them.

No less deplorable are the accounts from Chattigaon in this same kingdom; three of these accounts I herewith enclose, one of them wrote by Mr. Edward Gulston, a young gentleman in the service of the East India Company, and two others translated from a Persian original, made out by order of Mr. Verlat, chief of our East India Company's affairs in that province; in consequence of which accounts, the Company's lands there have not been so highly assessed as before this calamity. Both these accounts are translated from the same original; but that which I received from Governor Vansittart, being thought exaggerated from interested motives, I begged Mr. Gulston to give me a literal translation from the Persian, in which language he has made

an uncommon progress, as much to his present honour, as I hope it will be to his future advantage. This favour he obligingly granted me, and I send it to you, Sir, not only to compare it with the other translation, but to give you some distant idea of the idiom and great simplicity of this Eastern language.

"The same Earthquake was also very alarming at Ghiratty, when Colonel Coote, with his Majesty's troops, was in cantonments, about 18 miles up the river from this place. The water in the river and tanks there were violently agitated, and in many places rose to more than six feet perpendicular height, of which I had ocular demonstration myself on my return from Chandernagore, a settlement lately belonging to the French, about three miles North from Ghiratty, and in latitude $23^{\circ} 54'$ N. where it was felt, but not in a great degree: for I knew nothing of it myself, till it was soon after told me by a certain French gentleman there.

"Nearly, at the same time, was this Earthquake felt at Calcutta, as I am informed the agitation of the waters in the tanks rose upwards of six feet, and was to the direction North and South. The height of the thermometer on Fahrenheit's scale was then at Calcutta $95^{\circ} 30'$, much higher than it had been observed to be during the whole month, the lowest descent of the mercury being 89 degrees. In this month, there was much thunder and lightning, and there were fresh gales of wind at S. E.; the weather in general being close and sultry.

"A subsequent Earthquake was felt at Calcutta on the 13th of July following, at half-past two in the afternoon. The thermometer was then at $87^{\circ} 4'$ at a medium, the wind S. W., and the weather fair: to this I was a witness myself, being then at dinner with Capt. Elser of H. M.'s 84th Regiment. The motion of the earth caused a very sensible vibration of the wine in our glasses, and the shock was repeated twice at the interval of a few seconds."

The great shock of the 2nd was followed by a succession of minor shocks, which continued until the 19th April, and are detailed in the following Extract of a letter from Mr. Edward Gulston at Chittagong, to Major John Carnac at Calcutta.

"DEAR SIR,—The reason principally of this address is to give you a particular account of the shocks of a violent Earthquake which were felt here on the 2nd instant, at 5 in the afternoon, lasting the space of four minutes. The factory, a brick building, is quite spoiled, so as not to be safely habitable: for thereabouts, and in many other places, the earth opened, and the waters rushed out prodigiously: and in the chaise-road, especially towards the north quarter, there are great chasms, two feet wide and upwards, so strange, that the morning after riding that way, my horse started and went round another way, not willing to go over them.

"At the time of the first shock, great explosions were heard, like the noise of cannons, of which Mr. Plaisted and others counted 15.

"All the tanks overflowed their banks, fish were cast up, and the river rushed upon the shore like the surf of the sea. It was the most extra-

ordinary event I was ever witness to. By the enclosed paper you will discern how many alarms we had; however, nothing equal to the first, in which the whole force of the Earthquake seems to have been exerted. At present, the afternoon of the 4th April, all our heads seem to be quiet and still, and consequently the earth at rest; but really yesterday, from the repeated tremors of the ground, every one appeared giddy and alarmed, fancying the earth to be in perpetual vibration, which, however, an experiment of placing a glass of water on the floor proved to be not the case. I would not that such a shock as the first should happen at Calcutta for all I am worth, since of necessity the terraced houses must fall to ruin, and I please myself with the thoughts, that we have had the worst of it.—*Chittagong, 4th April, 1762.*

“Copy of the paper mentioned in the foregoing letter:—

Chittagong, April 2, 1762.

“April 2, at 5h. p. m. A severe shock of an Earthquake, lasted four minutes.

| | |
|--------------|------------------------------|
| 5h. 12m. | A second, lasted one minute. |
| 5 30 | A third. |
| 7 0 | A fourth. |
| 10 0 | A fifth. |
| „ 3, 1 A. M. | A sixth. |
| 2 „ | A seventh. |
| 3 „ | An eighth. |
| 5 „ | A ninth. |
| 10 25 | A tenth. |
| 10 30 | A eleventh. |

“Between 6 and 7 in the evening, I felt a twelfth shock: also others upon Marriott's hill, at a distance from Mount Pleasant, which every one thought in continual motion.”

The following translation of another Persian paper, concludes the series illustrative of the effects of the shock now under notice.

“The weather being very close and warm for some days preceding, on the 2nd April, about 5 in the afternoon, we were alarmed by an Earthquake; which beginning with a gentle motion, increased to so violent a degree for about two minutes, that the trees, hills, and houses shook so severely, that it was with difficulty many could keep their feet; and some of the black people were thrown on the ground, whose fears operated so powerfully, that they died on the spot: others again were so greatly affected, that they have not recovered themselves since.

“On the plains, by the river and near the sea, it was chiefly felt with great severity.

“Our bungalows proved very convenient on so melancholy an occasion, for had we been in brick houses, they must inevitably have been shattered or levelled with the ground; as there is not a brick wall or house but is either greatly damaged or fallen.

" Our new room in the fort, although as strong as bricks and chunam could make it, is shivered from all sides from top to bottom; and the old building, equally cracked, is in great part tumbled down.

" The motions were so complicated, that we could not well determine their direction: being sometimes from West to East, and again from East to West: and the tanks in some places overflowed from North to South.*

" In Pergunnah Deeang, Burseah Gong, the ground in several places opened ten and twelve cubits wide: and in some parts so deep, that they could not fathom its bottom, the water immediately overflowing the whole town, which is sunk about seven cubits.

" Deep Gong, a village near the other is also sunk, and now lies seven cubits under water.

" From Patter Gattah to Howlah, a distance of 8 coss (12 miles,) the ground opened, and a great quantity of water was immediately thrown out, and in several places the ground entirely sunk.

" At Bansburreah, Akulpoor, near the sea, the earth opened in seven places, like wells, throwing up the water ten cubits high: the great cutchery there with brick walls, is cracked and shivered to pieces.

" At Huldah Creek, near Sancheram Conguy's house, twelve don of ground is entirely sunk.

" In the Pergunnah ditto Hazary, Hurry Sing Hazary's brick house was entirely thrown down: the hall of Seer Jumma Khan's brick house also fell, and himself was greatly hurt by the bricks: near which the ground opened 200 cubits, and immediately filled with water, which is now unfathomable.

" In Howla Pergunnah, Sam Roy Gapildar's house broke down, and his compound was filled with water of two cubits deep for two days.

" In Berrum Cherra, the ground overflowed about two cubits deep.

" Near Kutcha Ghaut, Kurrolea hill opened, and a great part of it fell into the river.

" Bagally Creek and ditto Hazarry Creek are both filled up.

" At Gunderah Juwar, three don of ground is entirely sunk.

" Ali Chowdry's compound opened, and the water that immediately flowed out, filled a deep ditch that surrounded his house.

" From Suwabill Purgunnah to Mooradabad, three Taluckdar's grounds are entirely sunk, and four people killed.

" At Bar Chara, near the sea, five or six coss of ground immediately sunk, and out of four or five hundred people, about two hundred were lost, with all their cattle: and the greatest part of the remaining inhabitants, who ran into the woods, have not since been heard of.

" Nulla Nunderam's brick house was broken down, and his son who was in it then, was so much bruised, that he died in three days afterwards.

* The ground opened in several places in the town, throwing up water of a very sulphurous smell: and several tanks and ditches were filled up, which are now level dry land.

"At Lalettee, Selcope Chukla, the ground in some places opened and threw up great quantities of salt water, and in others entirely sunk; the channel of several creeks and little vallies between the hills were filled up with great quantities of sand; in some places, the water still continues twenty cubits deep, and in others unfathomable.

"Silluk creek and Islammuttee river are both stopped up; several boats laden with goods then coming down, are not now able to get out of them: the country around there opened greatly in some places, and in others, entirely sunk: and a great many tanks filled with sand.

"Bur Collier hill opened about forty cubits wide.

"Sess Lung, Joom hill, one of the Mug mountains, is entirely sunk.

"Chungee hill opened between twenty and thirty cubits.

"Padoorah Creek, at that time without water, opened and threw up two hills of sand: and all the houses in these parts were broke down.

"Joom Chatea Pedea hill is sunk so low, that its top is now on a level with the plains.

"Rigerry hill, which was very large, opened thirty cubits wide.

"Joom Palang hill opened twenty-five cubits.

"By the accounts already come in, there are 120 dons* of ground lost in the different parts of the province; but these I am afraid will not be one-eighth part of the whole damages, as we have farther relations coming in every hour.

"As we are informed that two volcanoes opened, I am in great hopes these will prove a sufficient vent to discharge all the remaining sulphurous matter in the bowels of these countries, and put a stop to any farther Earthquakes here, at least for many years to come."

The hope, with which this paper closes, would seem to have been realised, as no farther shocks of severity from 1762 to the present time, are recorded, as having occurred in the province of Chittagong.

We have but very limited accounts of the effects of the Earthquake of 1762 upon the Arracan coast in general; but its influence on the Island of Chedooba, as described by Captain Halsted, (J. A. S. Vol. X. p. 433, &c.) may be taken as a specimen of what occurred, in all probability throughout the entire archipelago of volcanic islands which skirts that interesting coast. The whole of Captain Halsted's remarks are so intimately connected with my subject, that finding a difficulty in making a selection, I have thought it preferable to quote them in full.

"The geology of Chedooba," Captain Halsted remarks, "presents characters of so much general interest, that any report on this island might be looked on as imperfect in which the subject was wholly omitted."

"But as it is intended in a separate notice to give such details as may render the subject capable of investigation by those able and interested in the science, the present one will be confined to a mere statement of the general features exhibited.

* One sye don of ground is 1,920 cubits long, and 1,600 cubits broad.

"The elevation out of the sea of large tracts of land by effect of volcanic action, has in more modern times been noted as occurring on the coast of Chili in South America, and in the territory of Cutch in this country. In the former case, some doubt has been thrown both on the fact itself, as well as its amount: and the circumstance of a similar phenomenon having taken place within the memory of man, not only throughout the coasts of Chedooba, but extending over all the shoals and islands from the Terribles, off the North end of Ramree, to Foul Island, will be held a not unwelcome addition to the evidence yet gleaned of the occurrence of such extensive changes of level to the present day. The above are the limits of the survey on which the "*Childers*" was employed, over every part of which the evidences of this elevation were seen, and in many places accurately measured, and it includes the whole of that irregular collection of islands and shoals, which, projecting far into the Bay of Bengal, yet maintains the general direction of the mainland coast near it.

"But these limits are not to be taken as those which bound the elevation, which with little doubt, from the similarity of formation, will be found to extend North, South, and East over all those parts of Arracan, so peculiarly marked by the intersection of deep, narrow, salt-water creeks from Akyab, even perhaps as far South as Cape Negrais.

"The line which was under observation was about 100 miles in length, varying from 20 miles in breadth to that of a mere patch, according as the opportunity for notice was afforded by the existence or islets above water, and its general direction is from NW. by N. to SE. by S. The elevation has been greatest towards the centre of the line examined. At the Terribles, about 13 feet; on various parts of the N. W. reef of Chedooba 22 feet; at the North point of the Island 16 feet; at the centre of the Island, on the West coast, 13 feet; at the South end 12; and at the Islands south of it, as far as Foul Island, from that to 9 feet.

"It would also seem to have been greater on the western limit of Chedooba than on the eastern; a fact however not ascertained from the extensive level plains which exist on this side, whereas on that, measurements were easily made on the sides of the perpendicular rocks. This elevation occurred about 90 years ago.* There is now living a party, 106 years of age, who was then 15 years old, and had been accustomed to fish over the now-upraised land. On the coasts of Chedooba, its traces are in most parts as clear as could be wished, bounding the natural jungle with a bank of greater or less height, composed of sand or of shingle: the plain beyond being thickly strewed with corals and shells, such as are now growing on the shores. The natives are all perfectly aware of the bank having formerly been the limit of their island, and even the youngest would point it out, if asked to do so.

* This is no doubt the great Earthquake of 1762, which, as before mentioned, extended all along this coast.

"The old man, above-mentioned, was not at Chedooba, but at Ava when the event happened: he had gone thither that year, and experienced at that place the violent Earthquake which accompanied the elevation. From other natives of great age I received the information not direct, but traditionally, from their parents.

"The Earthquake was very violent, the sea washed to and fro several times with great fury, and then retired from the ground, leaving an immense quantity of fish: the feasting on which is a favourite story throughout the island; no lives were lost, no rents in the earth occurred, nor fire from the volcanoes of the island.

"The above is not the only event of the sort traditionally known, as another occurred a century previous to it, and these elevations are considered periodical by the inhabitants, occurring every hundred years, and the next is even expected within the course of a few years, and would excite but little surprise.

"Traces of a third beach line were several times thought to be found before this information was given: but on the western coast, about half way down, an evidence of its truth was afforded by a remarkable column, or rock, about 40 feet high, standing on the beach, which shewed the remains of a second line of rock. Oysters adhering to it at an equal elevation of 13 feet above the first, as it was again above the one which on all the rocks of the western coast distinctly points out the limit of the present high water. On Flat Island were subsequently found these distinct beaches, and the corals found on the different extents of the island, clearly proclaimed, in their relative states of decomposition, the difference of their periods of exposure.

"The external and more apparent means by which these great changes are effected, are, so far as yet known, I believe quite peculiar, and exhibit features which may be valuable in assisting investigation into the immediate causes of volcanic violence.

"Every one of the mud volcanoes of Chedooba was visited and examined, as well as those of the neighbouring islands south of it, and on none, with strictest search could be found any traces of direct fire, or of those peculiar formations produced by that agent. Gas alone seems to be the one occasioning these strange exceptions to the general character of volcanoes. It is no doubt inflammable gas, and the light given by some of them has been so great, as to enable a book to be read by it at a distance of nine miles, as was credibly related to me as having occurred at the last eruption of the large volcano of Meubrung, the largest on the island. That heat is present in the more recent ones, I found myself to be the case, in one examined on Ramree, where the mud brought up on a bamboo from 17 feet in depth, shewed a temperature of $92^{\circ} 20'$ above that of the atmosphere. But a white stone-like chalk, found on all the large volcanoes, which was considered to be the common greenish sandstone discoloured by heat, was the only substance found which exhibited a trace of intense heat, and in this case the abstraction of colour above was effected without the least

change of composition or form. The large volcanoes of Chedooba are four in number: they are detached mounds rather than cones, varying from 100 to 1,000 feet above the level of the sea, composed of a stiff grey clay, with large quantities of singular fragments of stone; their sides much cut up by the effects of rain; their summits quite bare, and from 240 to 250 yards in diameter: on these are disposed cones of stiff clay from a few inches to four feet in height, and the same variety of dimensions in diameter. These are hard on the outside, but filled half way up with a thick, well mixed mud, which every now and then exudes from a hole at the side or summit, at the bursting of a bubble of gas which takes place every three or four minutes. There are two other volcanoes of small dimensions, and but little elevation above the plains where they are found to exist; they are composed of the same soil of mud emitting large bubbles of gas: and besides, there are two spots where water alone is brought up by the gas. In all these the water or mud is salt, and their number, with the four petroleum wells which are in constant ebullition with gaseous exhalations, seem to exhibit the agent as powerfully and extensively at work throughout the island. The minor volcanic vents seldom exhibit any change: the larger ones when in eruption, which generally takes place during the rains, either throw forth to a considerable height accompanied by flame, fluid mud which spreads over a certain extent on the surface affected boils with the escapement of gas, being too consistent to flow, or be thrown up. The angular fragments of stone mixed with the mud are clearly torn from the strata, through which the vent is forced, and small portions of copper ore (? more probably sulphuret of iron) are found attached to them.

"Beside the volcanoes seen, one was described as existing under water on what is now a reef N. W. of Flat Island, and which a few years since gave forth flame when in eruption. But independent of such direct evidence, a new examination of many of the reefs would convince us of the fact of the bed of the sea having been equally affected with the surface of the land.

"I was informed by a native, that the extensive new plain on the N. W. part of the island, which was raised out of the sea about 90 years ago, was only then acquiring its first covering of grass when he visited it 15 years after its elevation.

"The Island of Chedooba measures $15\frac{1}{2}$ miles in length; viz. from $18^{\circ} 40'$ to $18^{\circ} 55' 30''$ N. latitude and 17 miles in width; viz. from $93^{\circ} 30'$ to $93^{\circ} 47'$ E. longitude, and shews on the map as a square, the South-west angle of which has been reduced with its dependency of Flat Island on the South coast; it covers an area of about 200 square miles. Its general appearance is that of a fertile, well-wooded island of moderate height and irregular outline. A band of level plain but little raised above the sea, extends around its coasts, of far greater width on the East than on the West. Within this lie irregular, low, undulating hills, varying in height from 50 to 500 feet, enclosing several higher

detached mounds of steep well-wooded sides, the loftiest of which, near the South part of the island, rises nearly 1,400 feet."

From the details given in this extract in combination with those given before, it appears that the range of the great Earthquake of April 1762 was from about 16° to 23° North latitude, or from near Cape Negrais to the northward of Calcutta, and from about 87° to 94° East longitude. These limits are I need scarcely remark, by no means certain, but the yare the nearest, which existing information admits of our arriving at. The province of Arracan seems to have been the seat of the greatest intensity of the shock, and the whole eastern coast of the Bay exhibits indications of having experienced its violence. We are fortunate in having such ample details from the province of Chittagong, as they furnish several phenomena of interest which will be discussed hereafter.

The other Earthquakes attributable to the tract now under notice are, as I previously remarked, traditional, and the traditions of their occurrence are confirmed by physical evidence on the coast. But as to their dates or phenomena, I have no information to give.

I may conclude the notice of the Arracan tract by a brief description of the volcanic features of portions of the coast not yet referred to.

I before stated, that in tracing the geographical limits of volcanic regions, Mr. Lyell did not carry that of the Moluccas beyond Barren Island, in latitude 12° N. The only indication of activity furnished by this island when described by Dr. Adam in 1832, consisted in the constant evolution of thin light smoke, (*Jour. As. Soc.* Vol. I, p. 128,) and ten years later when visited by Capt. Miller, the same effect continued (*McClelland's Journal*, No. 11, p. 423.) No records exist of any intermediate convulsion, either in the form of eruption or earthquake, nor am I aware of the island having exhibited any sympathy with the shocks that have been experienced on the coast of the main land.

Proceeding northward, the Island of Narcaudam, Dr. McClelland informs us, (*J. A. S.* vol. VII, p. 77,) is a volcanic cone raised to the height of 700 or 800 feet. This cone is situated in $13^{\circ} 22'$ North latitude: "its upper part is quite naked, presenting lines such as were doubtlessly formed by lava currents descending from the crater to the base, which last is covered with vegetation. No soundings are to be found within half a mile from the shore."

Chedooba, in latitude $18^{\circ} 40' 55''$ has already been described at length. In old charts it is represented as a burning mountain, a circumstance traceable to the intense light which, according to Captain Halsted, is occasionally emitted by the larger mud volcanoes, and which seen from a distance, would make the island appear to be in general eruption.

Ramree, in lat. 19° N. abounds in highly interesting volcanic phenomena. Mud volcanoes similar to those in Chedooba are numerous, and earthy cones of smaller dimensions covered merely with a green

sward, and emitting gas in bubbles, occur in great profusion along the coast. It is an interesting circumstance recorded by Dr. McClelland, that from the summit of one of the largest of these mud volcanoes, called Nayadong, vapour and flame were seen by the inhabitants of Kyook Phoo to issue to the height of several hundred feet above the summit, during the principal shock of the Earthquake of the 26th August 1833. "The phenomenon," Dr. McClelland remarks, "may have been occasioned by the concussion of the Earthquake bursting open some new fissure, from which a transitory stream of inflammable gas, such as supplies the celebrated burning fountain of Chittagong, may have issued."

The mud volcanoes here referred to are precisely similar in their character to those previously described as occurring throughout the coasts of Scinde and Mukran, and farther, to those which have been found on the coasts of Chili and Calabria, two of the most remarkable of modern Earthquake tracts.

Advancing still farther northward, we arrive at the Chittagong coast, where evidences of extensive alterations of level due to volcanic action are no less remarkable. An interesting proof of these is given in the "Mohit," or Ocean, a Turkish work on navigation in the Indian seas, written in 1554, and translated by Von Purgstall, (Jour. As. Soc. Vol. V. p. 466). In this work the author, Sidi, giving detailed instructions for the voyage from Diu to Shattigam, or Bengal, warns navigators with much earnestness against the dangers in their course among the islands on the coast of Chittagong. To the sailing instructions of Sidi, Mr. James Prinsep appends the following note: "There are now no islands seaward of the Chittagong coast to which the sailing directions of Sidi will apply: but Lieut. Lloyd of the Indian Navy, who has surveyed the line, informs us, that there is a long shoal, called 'The Patch,' parallel with the coast, which is nearly dry at low water, and may have formed the islands of Zengilia (referred to by Sidi,) three centuries ago, for there have evidently been great changes in those parts even within the memory of our own navigators."

I am not aware whether the coast of Chittagong generally presents those marked indications of active volcanic forces so strikingly developed throughout that of Arracan, but that such forces do exist beneath it, is proved by the remarkable hot spring about twenty miles to the northward of the town of Chittagong, the gaseous exhalations from which are very considerable, and are frequently in a state of ignition. I have been unable, however, to find any detailed account of the physical structure of this district, and its general character is accordingly unknown to me.

During the year 1843, volcanic action on the Arracan coast was displayed in a rare and interesting manner, by the formation of a new island, but as details of this phenomenon, more ample than any yet published, are to be expected, I defer any remarks upon it to a future opportunity. During the same year, shocks of Earthquake were also

experienced, which will be duly recorded in the Register, the materials for which are not yet arranged.

9. *Earthquakes of the Tract of the Eastern Ghauts.*

The notices of Earthquakes along the line of the Eastern Ghauts which I have been able to procure are few and brief: indeed my information from Southern India generally is of a very limited character, but as there are many intelligent and active cultivators of natural science in that portion of the empire, I do not despair of yet having it considerably extended.

The earliest, as also the most severe recorded shock was experienced at Ongole, (lat. $15^{\circ} 13' N.$, long. $79^{\circ} 56' E.$) in the year 1800. I am indebted to H. Piddington, Esq. for the following extract from the Asiatic Annual Register for 1801, in which the effects of the Earthquake and its accompanying hurricane are detailed:—

“Extract from a letter dated Ongole, 29th October 1800. We have experienced such exceeding heavy rain at Ongole for the last twenty-four days, that the surface of the country exhibits an entire sheet of water.

“On the 19th instant, about 10 minutes after 4 o'clock A. M., the wind blew a hurricane, when suddenly we felt a severe shock of an Earthquake, which kept the earth in continued agitation for nearly a minute. It shook down many houses, but I believe no person was killed in consequence.

“The Earthquake was introductory to a scene the most painful to my feelings to describe: at about 8 o'clock last night, the wind began to blow strongly with rain, and in about two hours the wind and rain had increased so violently, that the doors and windows were blown open and shivered to atoms.

“In this dreadful situation, it would have been advisable to have quitted our houses for the open plain, but that was impossible, as no one could stand for a moment against the impetuosity of the hurricane, nor would an object be observed at a yard's distance. We trusted in this dilemma to Omnipotence for protection, and placing ourselves in the strongest situations we could think of, we continually heard the trees and walls falling around us.

“The incessant loud claps of thunder, the vivid lightning, the strength of the wind, and the uncommonly heavy rain, were such as the oldest inhabitant never before experienced. The wind blew from the N. E., and continued till two o'clock this morning, when we had an interval of calm till three o'clock, during which we were employed in endeavouring to extricate our cattle from the ruins of the fallen buildings.

“At three o'clock, the storm recommenced from the S. E., and if possible with increased violence, and the houses being at this time all unroofed, we remained till day-break exposed to its utmost fury. When day-light appeared, nothing but death and destruction met the eye in every direction. The ground was covered with dead cattle,

birds, and fallen houses and trees; even the largest banian trees have not escaped: indeed there is scarcely a tree left in the district. It is melancholy to observe the devastation in the villages, and the inhabitants labouring to remove their families and cattle from the ruins."

In his note accompanying the above extract, Mr. Piddington informs me, that Dr. Malcomson, in his Paper in the Geological Transactions on the Basaltic districts of South India, (which I have unfortunately for myself never seen,) mentions, that up to the present time, the tract of country in which Ongole is situated is subject to slight shocks of Earthquake, and internal noises are frequently heard.*

Captain Newbold makes a similar remark relative to the district around Nellore, in which the copper mines are situated, in one of his Papers on the Mineral Resources of Southern India, published in the Journal of the Royal Asiatic Society.

The only other notice of Earthquakes referrible to this tract, is contained in Captain Henderson's Chronological Tables, from which it appears, that on the 15th of June 1837, a severe shock was experienced at Ganjam. No details however are given.

The preceding brief notices constitute the whole of the information relevant to the subject of Earthquakes I have as yet been able to collect from Southern India, and with them, the present summary closes.

I may now state in general terms, the results of the summary as illustrative of the distribution of disturbing forces throughout India and its frontier countries.

The great volcanic region which stretches from the Azores to Central Asia, is not extended by Mr. Lyell, beyond the country bordering the Oxus. From the details previously given, it however appears, that with this region are connected the Earthquake tracts of the Himalayas. We have seen that from the meridian of Herat to that of Assam earthquake shocks, sometimes of great severity, have been experienced along the central axis, and the lateral valleys of the Himalayan chain, and there is every probability therefore, that one great tract of volcanic action extends from the Azores to the eastern limit of these mountains. We still require farther information to enable us to define strictly the termination of the tract on the eastward. Since we know

The extract alluded to is as follows:—H. P.

* On emerging from the gorge in the Nella Malla range, the Pennar enters the plains of the Carnatic, and near its mouth flows through low hills of laterite. This deposit rests on the ordinary granite of the Carnatic, with its associated sienites, hornblende, schist, quartz rock, and mica slate. It is in a rock composed of a mixture of the last two minerals that the copper-mines of the Nellore district are situated. In the same neighbourhood, the sandstone and argillaceous limestone are little elevated above the sea, and are continuous with the same rocks on each side of the Kistnah. They are broken through by insulated basaltic hills, in the neighbourhood of which subterranean sounds and frequent local Earthquakes are reported to occur; an assertion I am the more inclined to believe, having myself experienced two slight shocks during a casual visit to the district.—*Geol. Trans.* Vol. V. N. S.

that Earthquakes of great violence have frequently devastated China, it is not improbable, that we may yet find this region extending across that country, and ultimately intersecting the train of the Philippines and Moluccas.

Returning to the westward, it would appear that from the eastern shores of the Caspian Sea, the line of volcanic force becomes divided, one portion following the course through the Himalayas just noted, while another diverging to the southward, passes through Persia, along the shores of the Persian Gulf and those of the Arabian Sea, till through Mukran, Scinde and Cutch, it becomes connected with the tract of the Vindhya, and is thus prolonged across the base of the Indian Peninsula, until it abuts upon the Himalayan line, by means of the mountains bordering Assam.

In this same vicinity, we find the northern limit of the great band of the Moluccas which has been extended through Arracan and Chittagong to the Kassy Mountains, where as formerly adverted to, indications of violent action are remarkably developed. * With this portion of the Vindhya and Molucca bands, are probably connected those forces which have given origin to the Earthquakes of the Gangetic Delta. And these latter may again form the link that joins the tract of the Eastern Ghauts with that of Chittagong, Arracan, and the Malayalan peninsula.

The tract of the Solimaun Mountains connects those of the Himalayas and the Delta of the Indus, while that of the Aravulli would seem to be an off-shoot from the Vindhya.

Two main lines in which the volcanic forces are distributed throughout India are therefore directly connected with that band which Mr. Lyell has traced from the Western Islands to the shores of the Caspian, while the third is similarly connected with the band that extends from the Aleutian or Fox Islands, in Russian America, to Barren Island in the Bay of Bengal. Nine distinct Earthquake tracts have been specified in this paper: of these two, namely, the central and lateral Himalayan tracts, are the indices of one of the main lines above alluded to; the other two, those of the Delta of the Indus and the Vindhya, constitute the second,* while the third is that of the Eastern Coast of the Bay of Bengal. With the last mentioned, the tracts of the Delta of the Ganges and of the Eastern Ghauts are considered to be connected, and the two remaining tracts, those of the Solimaun and Aravulli mountains, are merely subordinate lines.

Having thus endeavoured to exhibit briefly the results of this summary, I may now conclude by presenting a general Tabular View of Indian Earthquakes, compiled from the materials here collected. A very few shocks have not been referred to specific tracts, because the information relative to them was indistinct, but this may be rectified under more favourable circumstances.



1843.]

Memoir on Indian Earthquakes.

1055†

General Tabular View of Indian Earthquakes.

| Focal Tracts. | Number of Earthquakes. | Date of Earthquake. | Remarks. |
|----------------------------|------------------------|---------------------|--|
| 1. Central Himalayan. | 1 | 1803, | Very severe. |
| | 2 | 1809, | Ditto. |
| | 3 | 26th May 1817, | Ditto. |
| | 4 | 27th Ditto | Slight. |
| | 5 | 28th Ditto | Ditto. |
| | 6 | } Ditto | Ditto, felt in Kemaon. |
| | 46 | | |
| | 47 | 25th Dec. 1831, | Ditto. |
| | 48 | 2nd July 1832, | Ditto. |
| | 49 | 18th Aug. | Ditto. |
| | 50 | 23rd Sept. | Ditto. |
| | 51 | 30th May 1833, | Ditto. |
| | 52 | 4th Jan. 1835, | Ditto. |
| | 53 | 14th Jan. 1835, | Ditto. |
| | 54 | 5th March 1842, | Smart. |
| | 55 | 7th Sept. | Slight. |
| 2. Lateral Himalayan. | | | |
| A. Cabool. | 56 | 1505, | Very severe. |
| | 57 | 1829, | Severe. |
| | 58 | 1836, | Slight, several shocks experienced. |
| | 59 | } 14th Dec. 1837, | Ditto. |
| | 61 | | |
| B. Jellalabad. | 62 | 19th Feb. 1842, | Very severe. |
| | 63 | 22nd Feb. | Smart. |
| | 64 | 23rd Ditto | Ditto, shocks incessantly night and day. |
| | 65 | 24th Ditto | Ditto. |
| | 66 | 3rd March | Ditto. |
| | 67 | 20th April | Ditto. |
| | 68 | 4th Jan. | Slight. |
| | 69 | 10th June | Smart. |
| | 70 | 29th Ditto | Slight. |
| C. Cashmere. | 71 | 1552, | |
| | 72 | 1780, | Severe. |
| | 73 | 6th June 1828, | Very severe. |
| | 74 | 1831-2, | Severe. |
| D. Nepaul. | 75 | 1230, | |
| | 76 | 1829, | Smart. |
| | 77 | 26th Aug. 1833, | Very severe. |
| | 78 | } From Aug. to | |
| | 113 | | |
| E. Assam. | 114 | 14th Jan. 1839, | Slight. |
| | 115 | 3d June | Ditto. |
| | 116 | ..... .. | Ditto. |
| | 117 | ..... .. | Ditto. |
| | 118 | 14th Jan. 1840, | Ditto. |
| | 119 | ..... .. | Ditto. |
| | 120 | 3rd Feb. | Ditto. |
| | 121 | 4th March | Smart. |
| | 122 | 9th Feb. 1841, | Smart. |
| | 123 | 12th Oct. | Slight. |
| | 124 | 4th Jan. 1842, | Smart. |
| | 125 | 4th Feb. | Slight. |
| | 126 | 23rd Oct. | Ditto. |
| | 127 | 29th Ditto | Ditto. |



General Tabular View of Indian Earthquakes.

| Focal Tracts. | Number of Earthquakes. | Date of Earthquakes. | Remarks. |
|---|------------------------|----------------------|--------------|
| 3. Solimaun Mountains. .. | 128 | 1831, | Severe. |
| 4. Aravulli Mountains. .. | 129 | 15th June 1505, | Very severe. |
| | 130 | July 1720, | Ditto. |
| | 131 | 24th Oct. 1831, | Smart. |
| | 132 | Jan. 1842, | Slight. |
| | 133 | ..... | Ditto. |
| | 134 | 4th July | Ditto. |
| | 135 | 25th July | Ditto. |
| | 136 | 26th Sept. | Ditto. |
| | 137 | 27th Ditto | Ditto. |
| | 138 | 6th Nov. | Ditto. |
| 5. Delta of the Indus, | 139 | 16th June 1819, | Very severe. |
| 6. Vindhya Mountains. .. | 140 | B. C. 56. ? | |
| | 141 | 23rd May 1842, | Smart. |
| | 142 | 24th Ditto | Ditto. |
| 7. Delta of the Ganges. | 143 | 11th Oct. 1737, | Very severe. |
| | 144 | April 1810, | Smart. |
| | 145 | 18th Sept. 1829, | Ditto. |
| | 146 | ..... | Ditto. |
| | 147 | 11th Nov. 1842, | Severe. |
| 8. Eastern coast of the Bay of Bengal. | 148 | 2nd April 1762, | Very severe. |
| | 149 | ..... | Smart. |
| | 150 | ..... | Ditto. |
| | 151 | ..... | Ditto. |
| | 152 | ..... | Ditto. |
| | 153 | ..... | Ditto. |
| | 154 | 3rd April | Slight. |
| | 155 | ..... | Ditto. |
| | 156 | ..... | Ditto. |
| | 157 | ..... | Ditto. |
| | 158 | ..... | Ditto. |
| | 159 | ..... | Ditto. |
| | 160 | ..... | Ditto. |
| 9. Eastern Ghauts. | 161 | 29th Oct. 1800, | Smart. |
| | 162 | 15th June 1837, | Ditto. |

*In addition to the shocks registered, an immense number of minor shocks have occurred throughout the several tracts.

Comparative Tables of the Law of Mortality, the Expectation of Life, and the Values of Annuities in India and England. By Captain J. C. HANNYNGTON, 24th N. I. 1st Assistant G. G. A. Maunbhome.

The following Tables have been compiled from those prepared by Major Henderson, Mr. Griffith Davies, and the late Mr. Robert Christie. They exhibit nearly all that is known respecting the Law of Mortality among European Military Officers in India. To facilitate comparison the Northampton and Carlisle Tables are added.

Of the Indian Tables, Major Henderson's is presumed to be the most correct. It was deduced from actual returns for a period of 20 years; and was published with its data in the 17th Vol. of the Transactions of the Asiatic Society. From the age of 75, Major Henderson has adopted the Northampton Table, but has fixed 92 instead of 96 as the limiting age, which prevents literal agreement between the Tables.

Mr. Davies' Table was prepared for the Madras Military Fund, and is founded partly on data furnished by Col. DeHavilland, and partly on Mr. Christie's Table. From the age of 74, Mr. Davies has adopted the Northampton Table.

Mr. Christie's Table was "deduced from a record of 936 Officers, whose dates of appointments, retirements, and deaths he extracted from the books of the Honorable Company at the India House." From the age of 82, Mr. Christie has adopted the Carlisle Table.

The annual per centage of mortality for the Northampton and Carlisle Tables; the expectation of life for Christie's Table; and the values of Annuities at 6 per cent. for all the Indian Tables, have been computed by the writer of this Memorandum. Much care has been taken to render them correct.

TABLE I.—*Exhibiting the Law of Mortality in India and in England, according to various Authorities.*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 16 | ..... | 11300 | 5373 | ..... | 6261 |
| 17 | ..... | 11006 | 5320 | ..... | 6219 |
| 18 | 10000 | 10705 | 5262 | ..... | 6176 |
| 19 | 9741 | 10394 | 5199 | ..... | 6133 |
| 20 | 9489 | 10077 | 5132 | ..... | 6090 |
| 21 | 9243 | 9761 | 5060 | ..... | 6047 |
| 22 | 9004 | 9446 | 4985 | ..... | 6005 |
| 23 | 8771 | 9136 | 4910 | ..... | 5963 |
| 24 | 8501 | 8830 | 4835 | ..... | 5921 |
| 25 | 8239 | 8529 | 4760 | ..... | 5879 |
| 26 | 7985 | 8234 | 4685 | ..... | 5836 |
| 27 | 7739 | 7944 | 4610 | ..... | 5793 |
| 28 | 7501 | 7660 | 4535 | ..... | 5748 |
| 29 | 7246 | 7381 | 4460 | ..... | 5698 |
| 30 | 7000 | 7108 | 4385 | ..... | 5642 |
| 31 | 6762 | 6841 | 4310 | ..... | 5585 |
| 32 | 6532 | 6581 | 4235 | ..... | 5528 |
| 33 | 6310 | 6328 | 4160 | ..... | 5472 |
| 34 | 6080 | 6083 | 4085 | ..... | 5417 |
| 35 | 5859 | 5847 | 4010 | ..... | 5362 |
| 36 | 5646 | 5619 | 3935 | ..... | 5307 |
| 37 | 5441 | 5399 | 3860 | ..... | 5251 |
| 38 | 5243 | 5187 | 3785 | ..... | 5194 |
| 39 | 5034 | 4983 | 3710 | ..... | 5136 |
| 40 | 4833 | 4787 | 3635 | 6655 | 5075 |
| 41 | 4640 | 4598 | 3559 | 6557 | 5009 |
| 42 | 4455 | 4416 | 3482 | 6458 | 4940 |
| 43 | 4277 | 4241 | 3404 | 6356 | 4869 |
| 44 | 4093 | 4072 | 3326 | 6253 | 4798 |
| 45 | 3917 | 3909 | 3248 | 6146 | 4727 |
| 46 | 3748 | 3753 | 3170 | 6037 | 4657 |
| 47 | 3587 | 3602 | 3092 | 5925 | 4588 |
| 48 | 3432 | 3457 | 3014 | 5810 | 4521 |
| 49 | 3281 | 3317 | 2936 | 5691 | 4458 |
| 50 | 3136 | 3182 | 2857 | 5570 | 4397 |
| 51 | 2998 | 3052 | 2776 | 5446 | 4338 |
| 52 | 2866 | 2926 | 2694 | 5318 | 4276 |
| 53 | 2740 | 2804 | 2612 | 5188 | 4211 |
| 54 | 2628 | 2687 | 2530 | 5054 | 4143 |
| 55 | 2520 | 2573 | 2448 | 4916 | 4073 |
| 56 | 2417 | 2464 | 2360 | 4776 | 4000 |
| 57 | 2318 | 2358 | 2284 | 4632 | 3924 |
| 58 | 2223 | 2256 | 2202 | 4486 | 3842 |
| 59 | 2120 | 2158 | 2120 | 4338 | 3749 |
| 60 | 2022 | 2063 | 2038 | 4187 | 3643 |
| 61 | 1929 | 1971 | 1956 | 4034 | 3521 |
| 62 | 1840 | 1882 | 1874 | 3879 | 3395 |
| 63 | 1755 | 1796 | 1793 | 3722 | 3268 |
| 64 | 1639 | 1713 | 1712 | 3564 | 3143 |
| 65 | 1531 | 1632 | 1632 | 3405 | 3018 |
| 66 | 1430 | 1553 | 1552 | 3244 | 2894 |
| 67 | 1336 | 1476 | 1472 | 3082 | 2771 |
| 68 | 1248 | 1399 | 1392 | 2921 | 2648 |
| 69 | 1114 | 1321 | 1312 | 2759 | 2525 |
| 70 | 994 | 1241 | 1232 | 2593 | 2401 |

TABLE I.—*Exhibiting the Law of Mortality in India and in England, according to various Authorities,—(Continued.)*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian* Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|--|---------------------|
| 71 | 887 | 1161 | 1152 | 2424 | 2277 |
| 72 | 792 | 1079 | 1072 | 2253 | 2143 |
| 73 | 707 | 996 | 992 | 2081 | 1997 |
| 74 | 631 | 913 | 912 | 1907 | 1841 |
| 75 | 563 | 832 | 832 | 1737 | 1675 |
| 76 | 495 | 752 | 752 | 1571 | 1515 |
| 77 | 429 | 675 | 675 | 1410 | 1359 |
| 78 | 366 | 602 | 602 | 1255 | 1213 |
| 79 | 366 | 534 | 534 | 1109 | 1081 |
| 80 | 248 | 469 | 469 | 971 | 953 |
| 81 | 179 | 406 | 406 | 843 | 837 |
| 82 | 154 | 346 | 346 | 725 | 725 |
| 83 | 118 | 289 | 289 | 623 | 623 |
| 84 | 88 | 234 | 234 | 529 | 529 |
| 85 | 66 | 186 | 186 | 445 | 445 |
| 86 | 49 | 145 | 145 | 367 | 367 |
| 87 | 36 | 111 | 111 | 296 | 296 |
| 88 | 25 | 83 | 83 | 232 | 232 |
| 89 | 16 | 62 | 62 | 181 | 181 |
| 90 | 9 | 46 | 46 | 142 | 142 |
| 91 | 4 | 34 | 34 | 105 | 105 |
| 92 | 1 | 24 | 24 | 75 | 75 |
| 93 | .... | 16 | 16 | 54 | 54 |
| 94 | .... | 9 | 9 | 40 | 40 |
| 95 | .... | 4 | 4 | 30 | 30 |
| 96 | .... | 1 | 1 | 23 | 23 |
| 97 | .... | .... | .... | 18 | 18 |
| 98 | .... | .... | .... | 14 | 14 |
| 99 | .... | .... | .... | 11 | 11 |
| 100 | .... | .... | .... | 9 | 9 |
| 101 | .... | .... | .... | 7 | 7 |
| 102 | .... | .... | .... | 5 | 5 |
| 103 | .... | .... | .... | 3 | 3 |
| 104 | .... | .... | .... | 1 | 1 |

TABLE II.—*Shewing the Annual rate per cent. of Mortality in India and England.*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 16 | ..... | 2.60 | 0.99 | ..... | 0.67 |
| 17 | ..... | 2.73 | 1.09 | ..... | 0.69 |
| 18 | 2.52 | 2.90 | 1.20 | ..... | 0.70 |
| 19 | 2.73 | 3.05 | 1.29 | ..... | 0.70 |
| 20 | 2.79 | 3.14 | 1.40 | ..... | 0.71 |
| 21 | 2.85 | 3.23 | 1.48 | ..... | 0.69 |
| 22 | 2.90 | 3.28 | 1.50 | ..... | 0.70 |
| 23 | 2.96 | 3.35 | 1.53 | ..... | 0.70 |
| 24 | 3.02 | 3.41 | 1.55 | ..... | 0.71 |
| 25 | 3.09 | 3.46 | 1.58 | ..... | 0.73 |
| 26 | 3.14 | 3.52 | 1.60 | ..... | 0.74 |
| 27 | 3.21 | 3.57 | 1.63 | ..... | 0.78 |
| 28 | 3.27 | 3.64 | 1.65 | ..... | 0.87 |
| 29 | 3.31 | 3.70 | 1.68 | ..... | 0.98 |
| 30 | 3.35 | 3.76 | 1.71 | ..... | 1.01 |
| 31 | 3.40 | 3.80 | 1.74 | ..... | 1.02 |
| 32 | 3.44 | 3.84 | 1.77 | ..... | 1.01 |
| 33 | 3.49 | 3.87 | 1.80 | ..... | 1.01 |
| 34 | 3.53 | 3.88 | 1.84 | ..... | 1.02 |
| 35 | 3.58 | 3.90 | 1.87 | ..... | 1.03 |
| 36 | 3.62 | 3.91 | 1.91 | ..... | 1.04 |
| 37 | 3.67 | 3.93 | 1.94 | ..... | 1.09 |
| 38 | 3.72 | 3.93 | 1.98 | ..... | 1.12 |
| 39 | 3.76 | 3.93 | 2.02 | ..... | 1.19 |
| 40 | 3.81 | 3.95 | 2.09 | 1.47 | 1.30 |
| 41 | 3.86 | 3.96 | 2.16 | 1.51 | 1.38 |
| 42 | 3.90 | 3.96 | 2.24 | 1.58 | 1.44 |
| 43 | 3.95 | 3.98 | 2.29 | 1.62 | 1.46 |
| 44 | 3.99 | 4.00 | 2.35 | 1.71 | 1.48 |
| 45 | 4.03 | 3.99 | 2.40 | 1.77 | 1.48 |
| 46 | 4.08 | 4.02 | 2.46 | 1.85 | 1.48 |
| 47 | 4.12 | 4.03 | 2.52 | 1.94 | 1.46 |
| 48 | 4.16 | 4.05 | 2.59 | 2.05 | 1.39 |
| 49 | 4.23 | 4.07 | 2.69 | 2.13 | 1.37 |
| 50 | 4.29 | 4.08 | 2.84 | 2.23 | 1.34 |
| 51 | 4.38 | 4.13 | 2.95 | 2.35 | 1.43 |
| 52 | 4.44 | 4.17 | 3.04 | 2.44 | 1.52 |
| 53 | 4.52 | 4.17 | 3.14 | 2.58 | 1.61 |
| 54 | 4.59 | 4.24 | 3.24 | 2.73 | 1.69 |
| 55 | 4.67 | 4.24 | 3.35 | 2.85 | 1.79 |
| 56 | 4.76 | 4.30 | 3.47 | 3.02 | 1.90 |
| 57 | 4.84 | 4.33 | 3.59 | 3.15 | 2.08 |
| 58 | 4.92 | 4.34 | 3.72 | 3.30 | 2.42 |
| 59 | 4.99 | 4.40 | 3.87 | 3.48 | 2.83 |
| 60 | 5.07 | 4.46 | 4.02 | 3.65 | 3.35 |
| 61 | 5.15 | 4.51 | 4.19 | 3.84 | 3.58 |
| 62 | 5.43 | 4.57 | 4.32 | 4.05 | 3.74 |
| 63 | 5.75 | 4.62 | 4.52 | 4.25 | 3.82 |
| 64 | 6.09 | 4.73 | 4.67 | 4.46 | 3.98 |
| 65 | 6.49 | 4.84 | 4.90 | 4.73 | 4.11 |
| 66 | 6.95 | 4.96 | 5.15 | 4.99 | 4.25 |
| 67 | 7.46 | 5.22 | 5.43 | 5.22 | 4.44 |
| 68 | 8.06 | 5.57 | 5.74 | 5.55 | 4.65 |
| 69 | 8.77 | 6.06 | 6.10 | 6.02 | 4.92 |
| 70 | 9.61 | 6.45 | 6.49 | 6.52 | 5.16 |

TABLE II.—*Shewing the Annual rate per cent. of Mortality in India and England.—(Continued.)*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 71 | 10.2 | 7.06 | 6.94 | 7.05 | 5.88 |
| 72 | 10.8 | 7.69 | 7.46 | 7.63 | 6.81 |
| 73 | 11.2 | 8.33 | 8.06 | 8.36 | 7.81 |
| 74 | 12.1 | 8.87 | 8.77 | 8.91 | 9.02 |
| 75 | 13.4 | 9.62 | 9.62 | 9.56 | 9.55 |
| 76 | 14.7 | 10.24 | 10.24 | 10.25 | 10.30 |
| 77 | 16.4 | 10.81 | 10.81 | 10.99 | 10.74 |
| 78 | 19.0 | 11.30 | 11.30 | 11.63 | 10.88 |
| 79 | 20.5 | 12.17 | 12.17 | 12.44 | 11.84 |
| 80 | 22.0 | 13.43 | 13.43 | 13.18 | 12.17 |
| 81 | 23.4 | 14.78 | 14.78 | 13.99 | 13.38 |
| 82 | 25.2 | 16.47 | 16.47 | 14.07 | 14.07 |
| 83 | 25.3 | 19.03 | 19.03 | 15.09 | 15.09 |
| 84 | 25.8 | 20.51 | 20.51 | 15.88 | 15.88 |
| 85 | 26.0 | 22.04 | 22.04 | 17.53 | 17.53 |
| 86 | 29.4 | 23.45 | 23.45 | 19.34 | 19.34 |
| 87 | 33.3 | 25.22 | 25.22 | 21.62 | 21.62 |
| 88 | 43.7 | 25.30 | 25.30 | 21.99 | 21.99 |
| 89 | 55.5 | 25.81 | 25.81 | 21.55 | 21.55 |
| 90 | 75.0 | 26.09 | 26.09 | 26.06 | 26.06 |
| 91 | 100.0 | 29.41 | 29.41 | 28.57 | 28.57 |
| 92 | ..... | 33.33 | 33.33 | 28.00 | 28.00 |
| 93 | ..... | 43.75 | 43.75 | 25.93 | 25.93 |
| 94 | ..... | 55.56 | 55.56 | 25.00 | 25.00 |
| 95 | ..... | 75.00 | 75.00 | 23.33 | 23.33 |
| 96 | ..... | 100.00 | 100.00 | 21.74 | 21.74 |
| 97 | ..... | ..... | ..... | 22.22 | 22.22 |
| 98 | ..... | ..... | ..... | 21.43 | 21.43 |
| 99 | ..... | ..... | ..... | 18.18 | 18.18 |
| 100 | ..... | ..... | ..... | 22.22 | 22.22 |
| 101 | ..... | ..... | ..... | 28.57 | 28.57 |
| 102 | ..... | ..... | ..... | 40.00 | 40.00 |
| 103 | ..... | ..... | ..... | 66.67 | 66.67 |
| 104 | ..... | ..... | ..... | 10.000 | 100.00 |



TABLE III.—Shewing the Expectation of Life in India and England.

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 16 | .... | 24.72 | 35.85 | .... | 44.27 |
| 17 | .... | 24.37 | 35.20 | .... | 43.57 |
| 18 | 24.76 | 24.04 | 34.58 | .... | 42.87 |
| 19 | 24.40 | 23.75 | 33.99 | .... | 42.17 |
| 20 | 24.04 | 23.48 | 33.43 | .... | 41.46 |
| 21 | 23.67 | 23.22 | 32.90 | .... | 40.75 |
| 22 | 23.28 | 22.98 | 32.39 | .... | 40.04 |
| 23 | 22.89 | 22.74 | 31.88 | .... | 39.31 |
| 24 | 22.60 | 22.52 | 31.36 | .... | 38.59 |
| 25 | 22.30 | 22.29 | 30.85 | .... | 37.86 |
| 26 | 22.00 | 22.07 | 30.33 | .... | 37.14 |
| 27 | 21.68 | 21.86 | 29.82 | .... | 36.41 |
| 28 | 21.35 | 21.65 | 29.30 | .... | 35.69 |
| 29 | 21.08 | 21.45 | 28.79 | .... | 35.00 |
| 30 | 20.81 | 21.26 | 28.27 | .... | 34.34 |
| 31 | 20.52 | 21.07 | 27.76 | .... | 33.68 |
| 32 | 20.23 | 20.88 | 27.24 | .... | 33.03 |
| 33 | 19.92 | 20.69 | 26.72 | .... | 32.36 |
| 34 | 19.66 | 20.51 | 26.20 | .... | 31.68 |
| 35 | 19.38 | 20.32 | 25.68 | .... | 31.00 |
| 36 | 19.09 | 20.12 | 25.16 | .... | 30.32 |
| 37 | 18.79 | 19.92 | 24.64 | .... | 29.64 |
| 38 | 18.48 | 19.71 | 24.12 | .... | 28.96 |
| 39 | 18.23 | 19.50 | 23.60 | .... | 28.28 |
| 40 | 17.97 | 19.28 | 23.08 | 25.35 | 27.61 |
| 41 | 17.69 | 19.05 | 22.56 | 24.48 | 26.97 |
| 42 | 17.41 | 18.81 | 22.04 | 23.85 | 26.34 |
| 43 | 17.11 | 18.57 | 21.54 | 23.23 | 25.71 |
| 44 | 16.86 | 18.32 | 21.03 | 22.60 | 25.09 |
| 45 | 16.59 | 18.06 | 20.52 | 21.99 | 24.46 |
| 46 | 16.32 | 17.79 | 20.02 | 21.38 | 23.82 |
| 47 | 16.03 | 17.52 | 19.51 | 20.77 | 23.17 |
| 48 | 15.73 | 17.23 | 19.00 | 20.17 | 22.50 |
| 49 | 15.43 | 16.94 | 18.49 | 19.58 | 21.81 |
| 50 | 15.12 | 16.63 | 17.99 | 19.00 | 21.11 |
| 51 | 14.80 | 16.32 | 17.50 | 18.42 | 20.39 |
| 52 | 14.45 | 16.00 | 17.02 | 17.85 | 19.68 |
| 53 | 14.10 | 15.68 | 16.54 | 17.29 | 18.97 |
| 54 | 13.67 | 15.34 | 16.06 | 16.73 | 18.28 |
| 55 | 13.24 | 14.99 | 15.58 | 16.19 | 17.58 |
| 56 | 12.78 | 14.63 | 15.10 | 15.65 | 16.89 |
| 57 | 12.31 | 14.27 | 14.63 | 15.12 | 16.21 |
| 58 | 11.81 | 13.89 | 14.15 | 14.59 | 15.55 |
| 59 | 11.36 | 13.50 | 13.68 | 14.07 | 14.92 |
| 60 | 10.88 | 13.10 | 13.21 | 13.56 | 14.34 |
| 61 | 10.39 | 12.69 | 12.75 | 13.06 | 13.82 |
| 62 | 9.87 | 12.26 | 12.28 | 12.56 | 13.31 |
| 63 | 9.32 | 11.83 | 11.81 | 12.07 | 12.81 |
| 64 | 8.94 | 11.38 | 11.35 | 11.58 | 12.30 |
| 65 | 8.55 | 10.92 | 10.88 | 11.10 | 11.79 |
| 66 | 8.11 | 10.45 | 10.42 | 10.63 | 11.27 |
| 67 | 7.64 | 9.96 | 9.96 | 10.16 | 10.75 |
| 68 | 7.15 | 9.48 | 9.50 | 9.69 | 10.23 |
| 69 | 6.95 | 9.02 | 9.05 | 9.23 | 9.70 |
| 70 | 6.73 | 8.56 | 8.60 | 8.79 | 9.18 |

TABLE III.—*Shewing the Expectation of Life in India and England,—*
(Continued.)

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 71 | 6.47 | 8.12 | 8.17 | 8.37 | 8.65 |
| 72 | 6.20 | 7.72 | 7.74 | 7.97 | 8.16 |
| 73 | 5.88 | 7.31 | 7.33 | 7.58 | 7.72 |
| 74 | 5.53 | 6.92 | 6.92 | 7.23 | 7.33 |
| 75 | 5.13 | 6.54 | 6.54 | 6.89 | 7.01 |
| 76 | 4.77 | 6.18 | 6.18 | 6.56 | 6.69 |
| 77 | 4.43 | 5.83 | 5.83 | 6.25 | 6.40 |
| 78 | 4.41 | 5.48 | 5.48 | 5.97 | 6.12 |
| 79 | 3.81 | 5.11 | 5.11 | 5.68 | 5.80 |
| 80 | 3.59 | 4.75 | 4.75 | 5.42 | 5.51 |
| 81 | 3.39 | 4.41 | 4.41 | 5.17 | 5.21 |
| 82 | 3.19 | 4.09 | 4.09 | 4.92 | 4.93 |
| 83 | 3.01 | 3.80 | 3.80 | 3.65 | 4.65 |
| 84 | 2.87 | 3.58 | 3.58 | 4.39 | 4.39 |
| 85 | 2.66 | 3.37 | 3.37 | 4.12 | 4.12 |
| 86 | 2.40 | 3.19 | 3.19 | 3.90 | 3.90 |
| 87 | 2.08 | 3.01 | 3.01 | 3.71 | 3.71 |
| 88 | 1.80 | 2.86 | 2.86 | 3.59 | 3.59 |
| 89 | 1.50 | 2.66 | 2.66 | 3.47 | 3.47 |
| 90 | 1.22 | 2.41 | 2.41 | 3.28 | 3.28 |
| 91 | 1.00 | 2.09 | 2.09 | 3.26 | 3.26 |
| 92 | 0.50 | 1.75 | 1.75 | 3.37 | 3.37 |
| 93 | 0.00 | 1.37 | 1.37 | 3.48 | 3.48 |
| 94 | .... | 1.65 | 1.05 | 3.53 | 3.53 |
| 95 | .... | 0.75 | 0.75 | 3.53 | 3.53 |
| 96 | .... | 0.50 | 0.50 | 3.46 | 3.46 |
| 97 | .... | 0.00 | 0.00 | 3.28 | 3.28 |
| 98 | .... | .... | .... | 3.07 | 3.07 |
| 99 | .... | .... | .... | 2.77 | 2.77 |
| 100 | .... | .... | .... | 2.28 | 2.28 |
| 101 | .... | .... | .... | 1.79 | 1.79 |
| 102 | .... | .... | .... | 1.30 | 1.30 |
| 103 | .... | .... | .... | 0.83 | 0.83 |
| 104 | .... | .... | .... | 0.00 | 0.00 |

TABLE IV.—*Shewing the Value of an Annuity on a Single Life, according to Indian and English Tables. Interest being 6 per cent.*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 16 | .... | 10.314 | 12.755 | .... | 14.067 |
| 17 | .... | 10.225 | 12.655 | .... | 14.012 |
| 18 | 10.526 | 10.144 | 12.562 | .... | 13.956 |
| 19 | 10.454 | 10.074 | 12.477 | .... | 13.897 |
| 20 | 10.376 | 10.014 | 12.398 | .... | 13.835 |
| 21 | 10.291 | 9.959 | 12.329 | .... | 13.769 |
| 22 | 10.198 | 9.908 | 12.265 | .... | 13.697 |
| 23 | 10.097 | 9.859 | 12.200 | .... | 13.621 |
| 24 | 10.040 | 9.813 | 12.132 | .... | 13.541 |
| 25 | 9.981 | 9.769 | 12.063 | .... | 13.456 |
| 26 | 9.916 | 9.726 | 11.992 | .... | 13.368 |
| 27 | 9.846 | 9.686 | 11.917 | .... | 13.275 |
| 28 | 9.770 | 9.647 | 11.841 | .... | 13.182 |
| 29 | 9.720 | 9.613 | 11.763 | .... | 13.096 |
| 30 | 9.666 | 9.581 | 11.682 | .... | 13.020 |
| 31 | 9.606 | 9.552 | 11.598 | .... | 12.942 |
| 32 | 9.541 | 9.528 | 11.512 | .... | 12.860 |
| 33 | 9.470 | 9.503 | 11.423 | .... | 12.771 |
| 34 | 9.417 | 9.479 | 11.331 | .... | 12.675 |
| 35 | 9.359 | 9.453 | 11.236 | .... | 12.573 |
| 36 | 9.295 | 9.427 | 11.137 | .... | 12.465 |
| 37 | 9.224 | 9.400 | 11.035 | .... | 12.354 |
| 38 | 9.147 | 9.371 | 10.929 | .... | 12.239 |
| 39 | 9.098 | 9.340 | 10.819 | .... | 12.120 |
| 40 | 9.045 | 9.306 | 10.705 | 11.369 | 12.002 |
| 41 | 8.986 | 9.270 | 10.589 | 11.232 | 11.890 |
| 42 | 8.921 | 9.231 | 10.473 | 11.088 | 11.779 |
| 43 | 8.850 | 9.189 | 10.356 | 10.942 | 11.668 |
| 44 | 8.803 | 9.144 | 10.235 | 10.790 | 11.551 |
| 45 | 8.750 | 9.097 | 10.110 | 10.636 | 11.428 |
| 46 | 8.693 | 9.044 | 9.980 | 10.478 | 11.296 |
| 47 | 8.628 | 8.988 | 9.846 | 10.316 | 11.154 |
| 48 | 8.559 | 8.925 | 9.707 | 10.152 | 10.998 |
| 49 | 8.490 | 8.859 | 9.563 | 9.986 | 10.823 |
| 50 | 8.416 | 8.789 | 9.417 | 9.815 | 10.631 |
| 51 | 8.331 | 8.713 | 9.273 | 9.640 | 10.422 |
| 52 | 8.238 | 8.634 | 9.129 | 9.465 | 10.208 |
| 53 | 8.134 | 8.550 | 8.980 | 9.285 | 9.988 |
| 54 | 7.989 | 8.458 | 8.827 | 9.101 | 9.761 |
| 55 | 7.832 | 8.363 | 8.670 | 8.920 | 9.524 |
| 56 | 7.655 | 8.257 | 8.509 | 8.732 | 9.280 |
| 57 | 7.461 | 8.145 | 8.343 | 8.544 | 9.027 |
| 58 | 7.247 | 8.024 | 8.173 | 8.351 | 8.772 |
| 59 | 7.055 | 7.892 | 7.999 | 8.154 | 8.529 |
| 60 | 6.841 | 7.751 | 7.820 | 7.951 | 8.304 |
| 61 | 6.601 | 7.600 | 7.637 | 7.752 | 8.108 |
| 62 | 6.335 | 7.436 | 7.449 | 7.546 | 7.913 |
| 63 | 6.040 | 7.260 | 7.253 | 7.336 | 7.714 |
| 64 | 5.856 | 7.069 | 7.052 | 7.121 | 7.502 |
| 65 | 5.645 | 6.865 | 6.841 | 6.900 | 7.281 |
| 66 | 5.407 | 6.647 | 6.625 | 6.778 | 7.049 |
| 67 | 5.134 | 6.413 | 6.405 | 6.450 | 6.803 |
| 68 | 4.826 | 6.172 | 6.179 | 6.214 | 6.546 |
| 69 | 4.731 | 5.929 | 5.949 | 5.974 | 6.277 |
| 70 | 4.620 | 5.689 | 5.716 | 5.738 | 5.998 |

TABLE IV.—*Shewing the Value of an Annuity on a Single Life, according to Indian and English Tables. Interest being 6 per cent.—(Continued.)*

| Age. | Henderson for Indian Army. | Davies for Madras Army. | Price—Nor- thampton. | Christie for Re- tired Indian Officers. | Milne— Carlisle. |
|------|-------------------------------|----------------------------|-------------------------|---|---------------------|
| 71 | 4.488 | 5.446 | 5.479 | 5.506 | 5.704 |
| 72 | 4.328 | 5.212 | 5.241 | 5.279 | 5.424 |
| 73 | 4.139 | 4.985 | 5.004 | 5.059 | 5.170 |
| 74 | 3.916 | 4.764 | 4.769 | 4.851 | 4.944 |
| 75 | 3.652 | 4.542 | 4.542 | 4.645 | 4.760 |
| 76 | 3.403 | 4.326 | 4.326 | 4.445 | 4.579 |
| 77 | 3.163 | 4.109 | 4.109 | 4.250 | 4.410 |
| 78 | 2.929 | 3.884 | 3.884 | 4.061 | 4.238 |
| 79 | 2.714 | 3.641 | 3.641 | 3.959 | 4.040 |
| 80 | 2.550 | 3.394 | 3.394 | 3.792 | 3.858 |
| 81 | 2.402 | 3.156 | 3.156 | 3.630 | 3.656 |
| 82 | 2.258 | 3.926 | 3.926 | 3.474 | 3.474 |
| 83 | 2.123 | 2.713 | 2.713 | 3.286 | 3.286 |
| 84 | 2.018 | 2.551 | 2.551 | 3.102 | 3.102 |
| 85 | 1.851 | 2.402 | 2.402 | 2.909 | 2.909 |
| 86 | 1.642 | 2.266 | 2.266 | 2.739 | 2.739 |
| 87 | 1.369 | 2.138 | 2.138 | 2.599 | 2.599 |
| 88 | 1.090 | 2.031 | 2.031 | 2.515 | 2.515 |
| 89 | 0.806 | 1.882 | 1.882 | 2.417 | 2.417 |
| 90 | 0.518 | 1.689 | 1.689 | 2.266 | 2.266 |
| 91 | 0.236 | 1.422 | 1.422 | 2.248 | 2.248 |
| 92 | 0.000 | 1.136 | 1.136 | 2.337 | 2.337 |
| 93 | .... | 0.806 | 0.806 | 2.440 | 2.440 |
| 94 | .... | 0.518 | 0.518 | 2.492 | 2.492 |
| 95 | .... | 0.236 | 0.236 | 2.522 | 2.522 |
| 96 | .... | 0.000 | 0.000 | 2.486 | 2.486 |
| 97 | .... | .... | .... | 2.368 | 2.368 |
| 98 | .... | .... | .... | 2.227 | 2.227 |
| 99 | .... | .... | .... | 2.004 | 2.004 |
| 100 | .... | .... | .... | 1.596 | 1.596 |
| 101 | .... | .... | .... | 1.175 | 1.175 |
| 102 | .... | .... | .... | 0.744 | 0.744 |
| 103 | .... | .... | .... | 0.314 | 0.314 |
| 104 | .... | .... | .... | 0.000 | 0.000 |



*Experiments and Papers, principally by W. B. O'SHAUGHNESSY, Esq.
B. M. S. relating to the effects of Sea-water on Iron. Communi-
cated by the Government of Bengal.*

No. 2556.

*From the Under-Secretary to the Government of Bengal, to H. TOR-
RENS, Esq. Secretary to the Asiatic Society, dated Fort William,
30th October, 1843.*

SIR,—I am directed by the Deputy Governor of Bengal to forward copy of a letter from the Superintendent of Marine, No. 591, dated the 23d ultimo, and its original enclosures, relative to the corrosive effects of Salt-water on Iron, with His Honor's permission for the publication of the whole, or any part of the information therein contained on this highly important subject.

I have, &c.

(Signed) CECIL BEADON,

Under-Secretary to the Government of Bengal.

(Copy.) No. 591.

*From Major A. IRVINE, Superintendent of Marine, to the Hon'ble W.
W. BIRD, Deputy Governor of Bengal, dated Fort William, 23rd
September, 1843.*

HONORABLE SIR,—On the receipt of Mr. Secretary Bushby's letter, Letter to Dr. O'Shaughnessy, No. 1246, dated 13th April, 1841. No. 198, dated 10th March 1841, a correspondence was entered into with Dr. O'Shaughnessy, copy of which, as per margin, I have now the honor to forward, together with copy of a letter, No. 1156, dated 24th July, from the Superintendent of the Indian Navy.

2nd. Copy of this very interesting report was forwarded to the Controller of Government Steam Vessels, and I am now induced to send it to your Honor, under the idea that it may not be considered inexpedient to permit its publication in some of the periodical works of this Presidency.

I have, &c.

(Signed) A. IRVINE,

Superintendent of Marine.

(True Copy.)

(Signed) CECIL BEADON,

Under-Secretary to the Government of Bengal.



No. 1246.

To Dr. W. B. O'SHAUGHNESSY.

SIR,—In continuation of my letter, No. 1076, dated the 26th ultimo, I am directed by the Marine Board to forward to you, for your information, the accompanying copy of a letter, dated the 3rd instant, from the Acting Assistant Master Attendant at Madras, relative to the corrosive effects of Sea-water on Iron. I have, &c.

Fort William, Marine Board (Signed) C. B. GREENLAW,
Office, the 13th April, 1841. *Secretary.*

Fort William, Marine Superintendent's Office,
the 23rd Sept. 1843. (True Copy.)
 (Signed) C. B. GREENLAW, *Secretary.*

No. 599.

To Dr. W. B. O'SHAUGHNESSY, Chemical Examiner.

SIR,—With reference to my letters as per margin, I am directed
 No. 256 dated 21st Jan. 1841. by the Marine Board to request you will be
 „ 710 „ 25th Feb. „
 „ 874 „ 11th March „ good enough to report whether you have
 „ 1076 „ 26th „
 „ 1246 „ 13th April „ made any experiments with a view to ascertain the effects of Sea-water on Iron; and if so, the Board will feel obliged by your favoring them with the result of such experiments.

Fort William, Marine Board } I have, &c.
Office, the 28th August, 1841. } (Signed) C. B. GREENLAW,
Fort William, Marine Superintendent's Office, *Secretary.*
the 23rd Sept. 1843. (True Copy.)
 (Signed) C. B. GREENLAW, *Secretary.*

C. B. GREENLAW, Esq. *Secretary to the Marine Board.*

SIR,—In reply to your letter, No. 599, I beg leave to state, that I have completed a very extensive series of experiments on the effects of Sea-water on Iron. The results I trust will be found of some interest and usefulness. The voluminous notes of the experiments required to be reduced to order and copied, I fear much I can scarcely undertake to lay my report before the Board before the end of next



month, but if it be deemed emergently requisite, I will endeavour, at any inconvenience, to comply with the Board's wishes.

Calcutta, 31st August, 1841.

I have, &c.

(Signed) W. B. O'SHAUGHNESSY,

Chemical Examiner.

Fort William, Marine Superintendent's Office,

the 23d Sept. 1843.

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

C. B. GREENLAW, Esq. *Secretary to the Marine Board.*

SIR,—In continuation of a previous letter, I have the honor to resume the subject of the corrosion of Sea-going Iron Vessels, and the best means of its prevention.

2d. There exists no material difference in the constitution of the several waters you forwarded to me for analysis, or which I received from time to time from other sources, beyond a variable degree of dilution with fresh water from the influence of the tides.

3d. The object of my experiments, was to ascertain the comparative rate of corrosion effected by the waters of Saugor, the Bay of Bengal, and Kyook Phoo, the nature of the corrosion, and the best means of its prevention.

Rate of Corrosion.

4th. For the first object, pieces of sheet iron of six inches long, three broad, and accurately weighed, were immersed in the water in glass vessels, slightly covered to check evaporation, any loss from this cause being made up by rain water from time to time. The result of very numerous experiments conducted on this plan, is, that the rate of corrosion is exactly the same in all the waters under experiment, in a period of six months, being as nearly as possible 5 grains loss from each superficial foot daily.

5th. The influence of size of the plates was examined as far as opportunities permitted, by arranging sets of iron sheets, all in metallic contact, in the manner shewn in the accompanying diagram.* From

* The sheets of iron being merely arranged vertically, it has not been thought necessary to add the diagram.

experiments conducted in this way, the corrosion was found to increase, in an arithmetical proportion to the increase of the surface exposed. These experiments were carried as far as the exposure of 100 superficial feet.

6th. The influence of density was also studied, both on the waters sent by the Marine Board, and artificial saline solutions. The general result is, that so long as the temperature continues the same, no difference of corrosion occurs *within the limits of the natural variations in the density of the sea-water under experiment.*

The nature of the Corrosion.

7th. This is simple oxidation, the red oxide of iron being deposited in loose flakes on the exposed surface. The presence of air in the water accelerates the commencement of the action, but is not essential to its continuance. I have found that corrosion will not occur in boiled distilled water, hermetically sealed up. It takes place more slowly in salt-water, previously boiled, and then hermetically sealed up; and it occurs in the ordinary manner in common salt-water, not boiled, but secluded from access of air.

Obviation of Corrosion.

8th. The experiments made on this head may be classified as follows :—

- a.* Protection by Galvanic action.
- b.* Protection by Cements.
- c.* Protection by Varnishes.

9th. *a.* The experiments on this head were very numerous, and may be thus described.

Pieces or arrangements of sheet iron, ranging from eight superficial inches to 100 superficial feet, were tried for equal periods with zinc protectors, ranging from an equal size to one-hundreth the size of the sheet iron. The results I obtained are as follow :—

10th. For the protection of the iron the zinc must undergo corrosion, and when this ceases from any cause, the iron is attacked as usual. The corrosion or loss of 60 grains of zinc daily protects 100 superficial feet of iron, less than this will not suffice. On the other hand, increasing the surface of the zinc protectors increases the amount of corrosion of

the zinc, without giving greater protection. The practical inference is, that *the protectors should be massive, but of small surface*, and placed where they can be conveniently renewed; further, that it is an error to suppose, that merely zincing the heads of nails or rivets would suffice; such a method would be worse than useless, for the quantity of zinc thus used, would be insufficient to sustain the protection, and the corrosion which follows always commences at the points of contact with the late protector, thus endangering a vessel in its most important parts.

The zinc undergoes oxydation. If moving through sea water the oxyde is washed off and dissolved;—if quiescent, the oxyde is deposited in a spongy white coating on the iron. Besides oxydation the zinc also suffers considerable loss by its structure becoming granular and brittle, and readily disintegrated by friction.

11th. I have tried many other metals beside zinc, and found only one superior to it in protecting power. This is CADMIUM, which presents advantages of extraordinary value, were these not counter-balanced by the scarcity and dearness of the metal. While cadmium protects the iron with equal energy, its own corrosion is little more than one-third that of the zinc, and instead of becoming granular and incoherent like the zinc, its surface is always bright and solid. The present price of cadmium of course forbids its employment; but the high price I believe is attributable to there having been hitherto no use discovered for the article, which exists to the amount of 3 per 100 in many of the zinc ores of Great Britain. Were cadmium cheaply obtainable, it would at once be resorted to as an iron protector; its influence on copper I have not yet studied.

Protection of Tin Plate.

12th. I have extended this enquiry to the protection of tin plate, and with rather interesting results. Tin plate is perfectly protected by proportionally much smaller quantities of zinc than are required for iron. The surface of the tin fouls very slowly, the fouling is caused by the diffusion over it of the oxide of zinc. This is readily removed by washing it, by a brush or coir scrubber, with a weak alkaline liquid (a solution of one lb of *saji-mati* in 4 pounds of water is sufficient). This fact I represent as one of considerable value, and calculated to lead to much economy in the construction of buoys for Salt-water harbours,

and for the sheathing of boats and other small crafts, which can be hauled up from time to time. I beg to observe, that these remarks do not apply to fresh water buoys or boats. In fresh water, the tinned iron suffers corrosion, notwithstanding the presence of the zinc.

Cements and Varnishes.

13th. The plates forwarded to me by your Board from Captain Kinsman were immersed in Sea-water. In a week all began to soften, and in 14 days corrosion of the iron was taking place through the pores in the substance of the cement. I consider this method quite inapplicable from these and many other reasons.

14th. *Caoutchouc*.—This I applied in various forms. I find to my surprise that by three weeks' immersion, it softens so as to be detached by the slightest friction.

15th. *Asphaltum*.—This invaluable substance completely protects the iron if *rubbed on while hot*: it resists even strong nitric acid for months. But the application requiring the heating of the iron, opposes a great practical difficulty to its use. I find by mixing a small quantity (about one-eighth its weight) of fine sifted road dust with the asphaltum while melted, that it will adhere to the cold iron. It should be laid on by a wire brush, as no hair, or coir, or yarn brush will stand the heat. Practical men in the dock-yards can soon turn this fact to account.

16th. *Coal Tar* answers well as a retarder rather than a preventer of corrosion, provided all the volatile oil of the tar is entirely expelled by heat or exposure to the air, before the immersion of the iron. If this be neglected, the varnish soon washes away.

17th. *Coal Tar* boiled with one-eighth asphaltum gives an excellent protecting varnish, and one which can be applied to cold iron, and which dries much more perfectly than the coal-tar alone.

18th. Along with those above-mentioned, I have tried many others, such as the *Gab juice*, white and red lead paint, &c. but none approached in efficacy the articles above cited. Asphaltum is procurable cheaply from the Persian Gulf, whence it is occasionally imported into Calcutta under the name of *Zift-i-Roomie*. Purchasers not knowing its exact qualities, will have boiled pitch palmed on them instead, by the bazar venders. A simple test is exposure to the sun for from five to

ten minutes, according to the season; while this scarcely affects the asphaltum, it softens the pitch into a ductile mass.

Fouling by Marine Animals and Plants.

19th. This serious evil, so familiar to navigators, and so importantly exemplified in many of the papers submitted with this report, (see the statements regarding the *Phlegethon*, the *Sylph*, &c.) has of course engaged my attention, but as yet has led to no important results. Several proposals have been made to prevent this by the use of *poisonous* paints of different kinds. I do not anticipate much benefit from the proposal. If the paints are soluble in water, they must wash off. If insoluble, they are not likely to exercise any poisonous power. The simplest way to test this would be, by immersing a log of nux-vomica wood in Kyouk Phoo harbour, or any other place infested with the Balani or Tereido.

Singular inactivity of the water of the Baleaghaut Salt-works on tin plates.

20th. While carrying on the experiments on tin plate, my stock of Sea-water having been exhausted, I procured a quantity of brine in various stages of concentration from the Salt-works at Baleaghaut. Tin plate immersed without protectors in this water, underwent no change in four months, and the corrosion of iron was much retarded, though not entirely prevented. The water was rich in organic matter, and gradually became mouldy, as the experiments proceeded. This singular fact opens a most interesting field for investigation, which I regret much I have no longer the opportunity to pursue.

Mr. Mallet's Experiments.

* 21st. When my experiments were nearly completed, a report on those carried on for five years, and on a much larger scale, by Mr. Mallet in Dublin, reached this country, in the last volume of the "Proceedings of the British Association." Mr. Mallet's copious tables of results correspond so exactly with mine, that it becomes superfluous for me to encumber your Board with details. I send the volume containing the report, and which deserves the close attention of the Marine Board, and of all Engineers connected with sub-marine-works in iron.

1843.]

on the effects of Sea-water on Iron.

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22d. I forward also several papers which have reached me on this subject, and in which many facts and observations of much interest will be found.

23d. Lastly, I have to express my regret that in consequence of the state of my health compelling me to return to Europe immediately, I have not the leisure to present a more complete Report on this very interesting subject.*

I have, &c.

(Signed) W. B. O'SHAUGHNESSY, *M. D.*

Calcutta, the 23d November, 1841.

Chemical Examiner.

Memorandum of Papers appended.

1. Capt. Kinsman on a poisonous Cement.
2. „ Henderson, communicating various facts.
3. „ Williams of the "*Sylph*," ditto ditto.
- 4, 5, 6. Capt. Cleaveland's Abstracts of the voyage of the Iron Steamer "*Phlegethon*."
7. Mr. Johnson's observations on the corrosion of iron in the *Phlegethon*, communicated by Mr. Maddock.

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's

Office, the 23d Sept. 1843.

To E. A. BLUNDELL, Esq. Commissioner in the Tenasserim Provinces.

SIR,—Having been requested by you to give my opinion regarding the corrosive effects water may have on iron in these seas, I beg to state that I am of opinion, water in these seas is as destructive to iron as in any part of the world.

* The proofs of this report have been submitted to Dr. O'Shaughnessy for revision and correction.—Eds.



I have the honor to inform you of one particular instance which came under my notice about three years ago. When at anchor in the "*Swinton*," a little below your wharf, a large Burman boat hooked a chain, the original size of which must have been upwards of an inch in diameter, and was lost with the Brig "*Macaulay*" about ten years previous; it was completely eaten away with rust, and broke with its own weight in two fathoms of water; it must be taken into consideration that this chain was lying in *fresh* water more than half the time above-mentioned.

As the tenor of your letter leads me to suppose that an object would be gained by preventing corrosion on the bottom of iron steamers only, I beg to forward three experiments of mine on sheet iron, the ingredients are the same in each, but differ in quantity.

No. 1 has two measures of dammer and one of chunam, with one-sixteenth measure or less of *artol*, (or crude arsenic,) each pounded separately and sifted through a fine sieve, to which is added a sufficient quantity of wood-oil, and then well pounded together until it becomes in substance a stiff paste.

Directions for using the above.

Heat the bottom of the vessel as on common occasions, and lay it on with the hand, warm towels should immediately follow, which will make it as smooth as may be required, and the vessel may be floated as soon as finished; each coat I feel certain will remain good under water longer than any other composition yet known.

The qualities of inferior composition have often been proved under water on wood, with the exception of *artol*, but barnacles will adhere to it, which the *artol* will prevent.

On receiving your letter, I was doubtful whether the composition would adhere to iron, which doubt I trust has now been removed by the experiments now forwarded.

No. 2 has one measure of dammer and one of chunam, with the same proportion of *artol*. No. 3 has three measures of chunam, and one measure of dammer mixed and prepared as the above.

Moulmein, 1st December, 1840.

I have, &c.

(Signed) THOS. KINSMAN,
Commander H. C. Schr. "*Swinton*."



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P.S.—While using the above composition, the pounding of it should not cease, otherwise the substance will become hard.

(True Copy.)

(Signed) C. E. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's

Office, the 23d Sept. 1843.

To Dr. O'SHAUGHNESSY, Medical College.

20th May.

MY DEAR SIR,—I have been engaged for sometime at home in obtaining information as to the best means of preventing corrosion of Iron Sea-going Vessels, and had contracted to build an iron opium clipper, but waited to see the effect of the barnacle and limpet on the iron sides in three voyages from Liverpool to the Brazils. On docking her on her first return, you could not put the palm of the hand on her bottom clear of a limpet. On the second return, I could not find room for the ball of my thumb, so completely covered was it. The first voyage she was painted with red lead and linseed oil, the second some white lead was added, and the third voyage she was offered for sale in consequence of the inability to keep the bottom from getting so very foul, as to reduce her sailing qualities far below a common merchant ship, though she was a fast vessel.

The *Leviathan* Steamer, 2700 tons, building at Bristol, I visited, and saw experiments being made with 8 or 10 different compositions. The builder told me they had tried near 40, and I dare say by this time something will have been discovered.

I am a member of the institution of Civil Engineers, and will write to the Secretary next mail, to ascertain what has been done or discovered, and inform you of the result.

As to the copper, it had a bar of iron along the keel, and up and down stern and stern-posts. We had it on our voyage to China. The iron was destroyed in two years, I think, and I never renewed it. The copper lasted eleven years; with exception of her voyage to China and to Suez, she was running in the Hooghly. The patent yellow metal, or Muntz's patent, much used now for shipping, being about 20 per cent.

cheaper, (first cost,) is not superior to copper in any way. The zinc is not used now; I suppose from its so soon corroding, and in fact becoming rotten.

I shall be glad to afford you any information in my power, and am,

Yours, &c.

(Signed) ANDREW HENDERSON.

DR. O'SHAUGHNESSY, *Medical College.*

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's Office, the 23d Sept. 1843.

To M. RUSTOMJEE, ESQ.

DEAR SIR,—When the "*Sylph*" was docked after her return from the coast of China last December, we found her copper covered with large barnacles in clusters, although after she came in fresh water a great many had dropped off, but left the mark where they had been. The copper was likewise all in small holes, and rusted at the edges, the same as a piece of iron, a great quantity of which I think was mixed with the copper, which caused the barnacles and sea-weed to adhere, amongst which, when on the coast, were a large quantity of long worms resembling centipedes, but much smaller.

I remain, &c.

May 18, 1841.

(Signed) T. WILLIAMS.

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's Office, the 23rd Sept. 1843.

H. C. S. Vessel "Phlegethon," Calcutta, May 27, 1841.

SIR,—In reply to your letter of the 24th May, I beg to assure you I shall have great pleasure in affording all the information in my power on the effects of the voyage on our Iron Vessel.

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The "*Phlegethon*" left England with a clean bottom, having when on the slip received three coats of red lead and three of black varnish, which with an additional coating we partly succeeded in putting on at the Mozambique, will I hope be found to have entirely preserved the iron from corrosion, as at Mozambique I observed the coatings of red lead remained perfect, when the blacking had been worn off.

The first barnacles appeared and rapidly increased after crossing the Tropic, with another species, I think called the Tereido.

These were invariably scraped off on the arrival of the vessel in port, as well as a narrow belt of soft green weed, of which the water line was the margin, and the depth 8 to 9 inches, and of most rapid growth.

These obstructions to the vessel's sailing have, in from three to five weeks, become very great, reducing her rate of sailing frequently one-ninth, and occasionally upwards.

The barnacles are fast disappearing since our arrival in fresh water.

I have, &c.

(Signed) R. F. CLEVELAND.

W. B. O'SHAUGHNESSY, *M. D.*

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

*Fort William, Marine Superintendent's
Office, the 23d Sept. 1843.*

(Copy.)

To T. H. MADDOCK, Esq.

DEAR SIR,—I beg to have the honor of laying before you, a few remarks upon the nature of iron considered simply with relation to its adaptation for the entire construction of the hulls of Sea-going Vessels. The grand experiment of the practicability of this has been sufficiently and satisfactorily tried, by the recent arrival from England of three large Steamers built wholly of iron, but questions of great moment respecting the integrity (for want of a better term) of this metal when exposed to the chemical action of air or water, and also concerning the evils that are occasioned by the facility with which several kinds of marine animals appear to attach themselves to its surface, still occupy the attention of many very able naturalists, with the view of determin-

ing the extent of the former, and of preventing as much as possible the latter of these two great objections to the general employment of iron as a material for the purpose of Naval Architecture.

My appointment as Surgeon to the *Phlegethon*, one of the Steam Boats above alluded to, enabled me to make some observations upon the subject, not perhaps of any great value, but such as they are, I respectfully communicate them, with one or two suggestions resulting therefrom, which have at least this recommendation of being approved by Captain Cleaveland himself, particularly interested in the enquiry.

Knowing, however, that the Indian Government, with its usual energy and desire for the public good, has already instituted an investigation of the properties of iron, conducted by some of the most scientific men in Calcutta, I enter the discussion with diffidence, especially, as perhaps my views and recommendations upon the subject may differ very considerably from theirs, the result of long-conducted, and of course very accurate experiments. Scholastic leisure too, as it admits of an intimate knowledge with the whole circle of the sciences, or in lieu of that, of an immediate reference to the best authorities, is an advantage I have not possessed; but as an equivalent, and an apology also for intruding my remarks, I offer a constant residence and continual experience for above 18 months on board Iron Vessels, where opportunity was daily afforded me of observing and recording those facts, I conceived to be best suited for the determination of questions such as are now before us.

In the first place I have been led to believe, that the corrosion or oxydization of iron by sea-water is far from being an evil of that magnitude which it has been assumed to be; and in fact, I consider it to be the natural and only certain remedy to prevent the accumulation of marine animals and their habitations upon the surface of the metal exposed to the sea, resembling in this respect the very useful protective influence of the sea-salts on copper sheathing upon wooden vessels against a similar evil.

As regards the definition of oxydization, which the proper consideration of our subject certainly requires, the progress of Chemistry as a popular science, renders it unnecessary for one to enter more fully into details, than merely observing, that by the operation of general law of

nature, called the attraction of affinity, metals and all kinds of simple matter are disposed to join and form compound bodies with other kinds of matter in their immediate neighbourhood, and even when thus combined, if placed under favoring circumstances, compound bodies will frequently dissolve spontaneously intimate and very close relations, to assume new and totally different combinations with other substances; the only explanations for which, in our present state of knowledge, is, that in such cases, the elementary bases of the compound bodies are said to have a greater affinity or pre-disposition to join with the latter, than their former co-constituents, thus the carbonate of soda is disintegrated, and the union dissolved between the carbonic acid and the alkali soda, if it be placed in juxta-position with tartaric acid, for which soda has a greater affinity than it has for the carbonic acid; but to proceed would be to write a chemical lecture, and I will therefore terminate this otherwise endless digression, and return to my subject, by observing, that it requires the presence of very particular circumstances to produce any metal in a purely native state. The general rule is, that they are extracted from the earth in the condition of pyrites or salts, that is, in combination with oxygen, or some one of the various mineral acids, and from these salts, by the process of fusion, the different metals are reduced to the pure or working state.

After all the labor, however, bestowed upon them, the general tendency of metals is to return to their original condition of compound salts, and more than all iron seems disposed to this chemical alteration of structure, deriving readily from air, earth, and water, the necessary co-constituent oxygen, whilst fire only increases the intensity of attractive affinity, and thus accelerates the operation, so that all surrounding nature seems opposed to its remaining long in that metallic state which renders it at all useful or profitable; and as iron is daily becoming more and more employed for the purposes of mankind, it is an object of considerable moment to lessen as much as possible the vast expense, occasioned by the continually required replacement of the corroded or oxydized metal.

This, it is found, can be easily accomplished by opposing one law of nature to another, or in other words, antagonizing chemical affinity on the one hand, by electro-galvanism on the other, the best demonstrable proof of which operation is the well-known suspension of chemical

corrosion upon iron or copper when protected by contact with zinc; but here also I must be permitted to remark, that our best Chemists are altogether in the dark as regards a knowledge of the nature of these two powerful agents in the economy of the universe; we perceive their effects, and theorise upon their probable mode of acting, but nothing satisfactory or conclusive has yet been proved, except that we see the exercise of their opposite actions in the result of the protected metals before-mentioned, and are convinced, that analogy alone must direct us at present, in any attempts to extend our knowledge of the application of the anti-corrosive property of electro-galvanism, to useful and beneficial purposes.

But will the application of this principle or property of electro-galvanism be useful in the construction of iron ships; that is to say, will the protection from oxydization thus afforded to the hulls, be equivalent as a benefit obtained, to an evil which will certainly be consequent upon non-oxydization, namely, the accumulation of marine animals and their testaceous habitations upon the bottom of the vessel, and the same question may be also asked in cases where the iron is mechanically protected by thick layers of carbonaceous matter? I certainly think not; for independent of the retardation on the speed occasioned by the extensive surface, and sinuous character of the foreign bodies adhering, the necessity of every three or four months placing the vessel upon shore for the purpose of removing them from her bottom, must materially injure and strain her hull, besides the chances on such occasions in unknown parts, of her bed being of a rocky character, which would hazard at once her total loss, by the extensive injury she must sustain with her whole weight supported only upon points of rocks.

Let us, on the contrary, suppose, that an iron vessel starts for sea completely unprotected, the naked metallic surface of the iron fully exposed to the action of the water, we could anticipate no other consequence would result after a voyage of a few months, than perhaps a slight oxydization along the line of immersion, (owing to the combined action in that situation of air and water,) whilst the remainder of her bottom would be found to be clean, neither acted upon chemically by oxydization, nor affording the least harbour for those masses of barnacles, pedunculate or sessile, which, in the other case, experience has

proved would be the result. In fact such a vessel's bottom might be expected to present an appearance similar to that which an iron cable would do after a ship has continued at anchor some months, shewing evidences of corrosion only around the point immediately in contact with the surface of the water.

An opportunity of observing this difference in the condition of protected and unprotected iron placed in the same situation, and under the same circumstances, was afforded me whilst Surgeon of the *Pluto* Iron Steamer, which during a stay of nearly five months (repairing) in a small port in the south of Portugal, never raised her mooring anchors. It was found upon our departure, that an accumulation of testaceous animals, at least one inch in thickness, had taken place upon her bottom, covered or protected, as it was termed, with a coating of red lead paint, and afterwards with several layers of coal-tar, whilst the naked iron cables exposed to exactly the same aqueous influences, came up as clean as upon the day of our first anchoring.

Many experiments have also been made to prove this fact, that iron perfectly cleaned, will remain many months entirely submersed in water, without the least change being observed upon its surface.

I would also observe, that even the oxydization along the line of immersion, where it is exposed to the united action of the atmosphere and the water, is of such a character, as to afford no point for the adhesion of marine animals, for forming in small scales, easily detached, the attrition of the passing water is sufficient to remove them, and also the embryo attachments of such animal life that may have been deposited upon their surface.

It is curious to observe, how theory has in the case of iron-built ships, occasioned attention to be directed to an action in one situation and determined it to be an evil, while in reality it is most beneficial, and caused to be overlooked entirely the same action in another situation, where the corrosive influence exerts uncontrouled its fullest power, namely, in the hold of the vessel, upon the internal surface of the iron. Here, where there is always an accumulation of water to a certain extent, oxydization finds every circumstance favorable for operation—an increased temperature, water, both fluid and in a state of vapour, and a continued wash from the rolling of the vessel, which removing the newly-formed scales of oxydized metal, leaves again the naked

iron exposed to fresh attacks from the combined action of air and water. As surely and as rapidly as are the iron tanks for containing fresh water in men of war rendered useless by a similar operation, so will the hulls of iron vessels be corroded and destroyed, whilst the same mechanical means of protection which externally acts injuriously, forming a bed favorable for the attachment of marine vermin, would, applied internally, be the very best remedy that could be devised for preventing the extensive oxydization of the iron in this situation. I allude of course to the layers of coal tar, or otherwise bituminous compounds with which it is usual at present to overlay the bottoms of iron vessels.

As general opinion, however, appears to be in favor of some external covering for the iron, I know of none better suited to the purpose, than a medicated application long in use among the Persians and Arabs to protect the bottoms of their dows and other vessels from the adhesion, and consequent depredations of marine animals, and which appears to owe its protective power to the character of its principal ingredient — aloes, which either from its bitterness, or being a positive poison to such animals, completely prevents their adhesion; and as this in the case of iron vessels is a desideratum, a trial of it might be made, for I see no reason why the application should not operate equally beneficial in the one case as the other. The formula for its preparation, according to a recent publication under the head “Aloes,” is as follows: One ounce of aloes mixed with turpentine, tallow and white lead, is sufficient for covering two feet, and it requires about twelve pounds for a vessel of fifty tons burden. As a simple modification of this, I should recommend, that to the common red lead paint usually applied to the bottoms of iron vessels, such a quantity of aloes be added, as to make it correspond as nearly as possible with the composition used by the Arabs. One hundred weight of aloes, would be about sufficient for a vessel of 500 tons burden.

With respect to iron tanks for containing fresh water, here perhaps the electro-galvanic influence might be beneficially employed, although one probable result might be the putrefaction of the water, which in common unprotected tanks, remains for a considerable length of time both sweet and wholesome. Its admixture with the very visible particles of detached oxide of iron, is the only thing complained of by the sailors, but as this is in some measure conducive to their health, a

remedy on this account only is unnecessary, but as a means of lessening ship's expenses with respect to the replacement of iron tanks, which I believe in five years' use are completely worn out, perhaps the anti-corrosive agency of electro-galvanism might in this case be advantageously tried.

The accumulation of the oxide of iron in the water of the tanks after a long voyage, is certainly excessive; and to obviate this inconvenience, I would suggest, that a large filter, of simple construction, should be placed forward for the use of the crew; to be made of wood in the form of a large box, three feet high, with a breadth from side to side of three feet; and from before, backwards, one foot and a half should be divided into two compartments by a central division, which should be perforated with a number of small holes to the height of the nine inches from its lower edge, so as to admit of a free passage for water from one compartment to the other. At the bottom of one of these compartments, must be placed layers of sand to a corresponding height with that of the small holes in the division, or nine inches, gradually changing the character of the sand upwards, from fine beach to rough coarse shingle. Let the water to be filtered be poured over this sand, which it immediately percolates, rising on the other side to an equal height, according to a well-known law of Hydraulics, perfectly clear and pure, partaking of all the characters of the best spring water. Thus simply can be procured a daily supply of clean draught water, sufficient for the use of sixty or seventy men. I scarcely need add, that the box would be rendered more water-tight, were it to be lined either with zinc or lead. A small filter upon this principle, but made of slate by Sterling of London, we had on board the *Pheto* and the *Phlegethon*, and its simple construction and efficiency were frequently the subject of remark and admiration.

As regards iron tanks again, although I do not myself see any great necessity for affording them the protection of electro-galvanism, except to prevent expense, still it would be satisfactory I think to the profession at large, if the following experiment were permitted to be made on a vessel proceeding to sea. It would consist of nothing more than observing the condition of the water contained in two separate tanks, one of which should be brought under the influence of electro-galvanism by being placed in contact with zinc, whilst the other should be in the usual unprotected state. The Captain or

Surgeon might be instructed to report, after a certain interval of time, upon the condition of the tanks, and the comparative amount of the oxide of iron found in each, also as to the state of the water they respectively contained, whether pure and wholesome, or otherwise; and as the result of the whole, which of the two tanks they recommend as best calculated for the storing of water.

These remarks have been thrown together under circumstances particularly unfavorable, for from a very painful abscess forming subsequently to an attack of fever, the greater part of the rough draught of this letter has been drawn up in bed, whilst this copy has been written in great pain; this must be my apology for the very desultory and very hurried character of my communication, which I was anxious should be forwarded to you previously to the docking of the *Proserpine*, which I have been given to understand will take place in a few days, and which will afford a favorable opportunity for experimental trial, and of forming a fair comparison between her condition and that of the *Phlegethon*, after they have been a few months at sea, should any of the suggestions contained in this letter be acted upon in the refit of the *Proserpine*.

Should you consider these observations to be either presumptuous or intrusive, I am sorry for having occupied so much of your time in such a manner, but ask your excuse upon this ground, that they have been dictated solely by a desire to promote, as far as lay in my power, the interest of my country, both political and commercial, in this quarter of the globe. But not to detain you longer, with every respect, I am,

Howrah, July 12, 1841.

Dear Sir, &c.

(Signed)

CHARLES JOHNSON.

(True Copy.)

(Signed)

C. B. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's

Office, the 23d Sept. 1843.

No. 1156 of 1841.

Superintendent's Office, Bombay, 24th July, 1841.

SIR,—In compliance with your request, I have the honor to state, that as yet experience on the durability of Iron Vessels exposed to Sea-water in Bombay, does not afford sufficient data for judging of the probable durability in comparison with the same material on the Ganges.

1843.]

on the effects of Sea-water on Iron.

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2nd. There is reason to believe the corrosive power of Sea-water varies in different localities of this Harbour and the Red Sea ; it appears to be far greater than in the intermediate ocean, while on the Western Coast of South Africa, it far exceeds either. The corrosion sustained by the "*Berenice's*" paddle-wheels, during the short time she was off the Cape of Good Hope, was apparently greater in extent than during the whole time she has since been in India, and the Iron Boat taken out to the Niger by Mr. Laird, is said to have suffered much from corrosion. In the Red Sea a small description of barnacle forms on iron, beneath which corrosion is very rapid, destroying the outer coat of the metal ; it becomes honey-combed, the same effect in a degree in Bombay Harbour also, a weed grows upon it, destroying any paint or varnish with which it may be coated ; the best preservative has been found in a composition of red lead and linseed oil ; but for Steam Vessels' bottoms, mineral pitch and rosin melted in spirits of turpentine.

3rd. It may be worthy of remark, that the "*Hugh Lindsay*" has still the identical paddle-arm segments she started with in 1829.

4th. Time has not yet been given to form any very correct data of the durability of the Iron Boats, and in any opinion founded on analogy with the paddle-wheels of Sea-going Steam Vessels, various elements which we are as yet little acquainted with, must be taken into account. Thus the galvanic action of a stream of water passing along the copper, has been known to cut through heavy paddle-beam stays in an incredible short time, as also the arm and segments ; the quality of the iron may have an influence, as also the smoothness of surface in the plates composing the bottom of an Iron Vessel.

5th. Mooring chains are observed to be perfectly sound when laying in the mud, partially corroded when suspended, but very soon destroyed near the surface and in contact with the copper.

6th. Time and observation can alone throw light upon this little-understood and interesting theory. I have, &c.

(Signed) R. OLIVER, *Capt. R. N.*

To C. B. GREENLAW, Esq. *Secretary Marine Board, Calcutta.*

(True Copy.)

(Signed) C. B. GREENLAW, *Secretary.*

Fort William, Marine Superintendent's

Office, the 23d September, 1843.

Notes on, and a short Vocabulary of, the Hinduvee Dialect of Bundelkhand. By Major R. LEECH, C. B. Political Agent. From the Political Secretariat of the Government of India.

The Notes and Vocabulary were collected in the course of a five months' residence at Punna.

The Banpharā dialect differs from that now to be treated of. The latter is a mixture of corrupt Sanscrit, and perverted Persian; a kind of slurred and slovenly Oordoo.

The first peculiarity that strikes a stranger, is the substitution, at the end of words, of *o* instead of the Oordoo *á*; as, hamáro, instead of hamará. It is sometimes substituted for other vowels in the middle of words; as, moro, instead of merá. Another peculiarity, is, the substitution of *r*, and *n*, for the Oordoo *l*; as, mooree, for mulee; and nakareeyá, for lakree; and, sometimes, vice versa; as, leelo, for neelo. The Oordoo *the* is slovenly pronounced *te*.

The diminutives, or derogatives, of substantives are very generally used; as ghurwá as well as ghorá; tateewá as well as tatoo.

Of the Alphabet and Character.

The character is based on the Devanagree. The Sanscrit vowels क ख ए ह are unknown.

The kh is written घ, and not ख, while the real घ gh is not known.

The gh is written घ, and differs only from the घ dh by having the cross stroke.

The Sanscrit ड ञ and ण are unknown.

The b व differs from the w व only by a dot below; and the p प differs from the y प only in the same manner.

The Sanscrit य y is not known as a consonant, except in a compound letter; its place being supplied by j, which is also substituted for z. The Sanscrit श is unknown; its place being supplied by simples. In the same manner the Sanscrit kgh च is supplied by chh.

The Sanscrit ए e has two pronunciations: one, as *a* in mane, cane, &c.; the other, which I have expressed by ae, has the sound of *a* in

mare, care. The *o* has also two: as, *o* in cone; and *o* in bore, or *oa* in hoar.

I have distinguished the soft and hard letters, as follows:—

त t थ th द d ध dh

ट t ठ th ड d ढ dh

and the harsh ढ I have expressed generally by *ḍ*, and not by *r* following the Devanagree ढ, and not the Oordoo ढ *r*.

The Hinduvee character of Bundelkhand is written most correctly by the tribe of Káiths. The Banyans, in writing it, leave out all the vowels.

The Oordoo *w* is often changed into *b*; as, be for we (they).

The nasal dot (sun) I have expressed by *n*.

अ I have expressed by *a*; and आ by *á*.

इ by *i*, and ई by *ee*; उ by *u*, and ऊ by *oo*.

Gender.

A noun is made feminine from masculine, as follows: betá, bitiyá; ghorá, ghuriyá; a female speaking uses *ee* instead of *o* in the termination of the first person.

Number.

The plural number is formed from the singular, as follows:—

| | |
|---------|----------|
| ghoro, | ghore. |
| pátee, | páteen. |
| kutiyá, | kutiyán. |

Case.

The inflected case, ready for receiving the addition of the post positions, is formed as follows:—

Singular.

ghoro,
ghore,

Plural.

ghore.
ghoran.

PRONOUNS.

Singular.

mae, I
mo, inflected case,

Plural.

ham.
ham (hawá.)

| | |
|---------------------|------|
| tae, thou | tum. |
| to, inflected case, | tum. |
| ae, this | ae. |
| in, inflected case, | in. |

| | |
|---------------------|------|
| oo, that | oo. |
| oo, inflected case, | oon. |

| | |
|-----------------------|--|
| apun, self | |
| apun, inflected case. | |

| | |
|----------------------|--|
| ko, who | |
| kee, inflected case. | |

| | |
|----------------------|--|
| ká, what | |
| káe, inflected case. | |

The Cardinal numbers that differ from the Oordoo, are :—

| | |
|---------------|---------------|
| 16 sorá, | 51 inkyáwan. |
| 38 aḍtees, | 54 chouwan. |
| 44 chawálee, | 57 santáwan. |
| 46 cha,álee, | 58 autháwan. |
| 49 unanchás, | 67 sarsath. |
| 68 arsath, | 93 teránawe. |
| 83 terasee, | 97 santánawe. |
| 89 nouwásee, | 98 antánawe. |
| 91 inkyánawe, | 99 ninyánawe. |

In like manner the following are the Ordinal numbers :—

| | |
|---------------|--------------|
| 5th pānchanw, | 8th atanw. |
| 6th chhatanw, | 9th namanw. |
| 7th satanw, | 10th dasanw. |

Fractions.

$\frac{1}{4}$ páw. $\frac{1}{2}$ ádho. $\frac{1}{3}$ tiháo.

Names of the Months.

Chait, sunwat 1900, commenced or will commence in 1843 on 14th Mar.

| | | | |
|----------|---|---|-------------|
| Baisáck, | " | " | 12th April. |
| Jeth, | " | " | 12th May. |
| Asád, | " | " | 11th June |
| Sáwan, | " | " | 11th July. |
| Bhádo, | " | " | 10th Augt. |
| Koohâr, | " | " | 9th Sept. |
| Kátik, | " | " | 9th Oct. |
| Aghan, | " | " | 8th Nov. |
| Poos, | " | " | 8th Dec. |
| Máh, | " | " | 13th Jan. |
| Phágan, | " | " | 12th Feb. |

Lond, the 13th intercalary month every 3d year.

Days of the Month.

| | | |
|--------------|------------------------|-----------------|
| parmá, | 1st (after full moon,) | 8th áthe. |
| doj, | 2d | 9th name. |
| teej, | 3d | 10th dase. |
| choth, | 4th | 11th eka dasee. |
| pánche, | 5th | 12th duá dasee. |
| chhat, | 6th | 13th teras. |
| sáte, | 7th | 14th chondas. |
| 15th Amáwas, | | 30th Poone. |

From 1st to 15th, is termed badee or lagat.

From 15th to 30th, is termed sudee or utarat.

Jeth badee áthee }
 Samvat, 1900 } 20th May, 1843.

CONJUGATION OF AUXILIARY VERBS.

INDICATIVE MOOD.

Present Tense.

| | |
|-----------|----------|
| mae ánw, | ham hae. |
| tae á, i, | tum ho. |
| oo á, i, | be hae. |

Perfect Past Tense.

| | |
|-----------|-----------|
| mae hato, | ham hate. |
| tae hato, | tum hate. |
| oo hato, | be hate. |

Imperfect Past Tense.

| | |
|-------------|-------------|
| mae hot to, | ham hot te. |
| tae hot to, | tum hot te. |
| oo hot to, | be hot te. |

Pluperfect Past Tense.

| | |
|--------------|----------------|
| mae bhoa to, | ham bhai,e te. |
| tae bhoa to, | tum bhai,e te. |
| oo bhoa to, | be bhai,e te. |

Future Tense.

| | |
|-------------|-------------|
| mae hoohon, | ham hoonhe. |
| tae hoohae, | tum hoonho. |
| oo hoohae, | be hoonhe. |

IMPERATIVE MOOD.

| | |
|---------|----------|
| tae ho, | tum how. |
|---------|----------|

SUBJUNCTIVE MOOD.

(*Kaját, if Perfect Past Tense.*)

| | |
|-----------|-----------|
| mae hoto, | ham hote. |
| tae hoto, | tum hote. |
| oo hoto, | be hote. |

Verbal noun.

hubainyá.

Infinitive.

hobo.

CONJUGATION OF THE VERB *Khabo*, to tell.
Present Tense.

| | |
|------------|------------|
| mae kahat, | ham kahat. |
| tae kahat, | tum kahat. |
| oo kahat, | be kahat. |

Perfect Past Tense.

| | |
|--------------|---------------|
| máene kahee, | ham ne kahee. |
| taene kahee, | tum ne kahee. |
| oone kahee, | un ne kahee. |

Imperfect Past Tense.

| | |
|-----------------|-----------------|
| mae kahat ható, | ham kahat hate. |
| tae kahat ható, | tum kahat hate. |
| oo kahat ható, | be kahat hate. |

Pluperfect Past Tense.

| | |
|--------------------|---------------------|
| maene kahee hatee, | ham ne kahee hatee. |
| taene kahee hatee, | tum ne kahee hatee. |
| oone kahee hatee, | un ne kahee hatee. |

Future Tense.

| | |
|-------------|-------------|
| mae kenhon, | ham kenhen. |
| tae kenhe, | tum kenho. |
| oo kenhe, | be kenhen. |

IMPERATIVE MOOD.

| | |
|----------|-----------|
| tae kon, | tum kaho. |
|----------|-----------|

SUBJUNCTIVE MOOD.

Present Tense.

| | |
|------------|------------|
| mae kahon, | ham kahen. |
| tae kahe, | tum kaho. |
| oo kahe, | be kahen. |

Perfect Past Tense.

| | |
|------------|------------|
| mae kahto, | ham kahte. |
| tae kahto, | tum kahte. |
| oo kahto, | be kahte. |

Verbal Noun.

kahainyá.

Adverbs, Past and Prepositions, Conjunctions, &c. &c.

| | | | | |
|---------|---|--------|----------|----------------|
| oonche, | } | above, | bheetar, | in. |
| ooper, | | | báhar, | without. |
| khále, | } | below. | adhpar, | in the middle. |
| taren, | | | ite, | here. |

| | | | |
|--------------|-----------------|--------------|-----------------------|
| ute, | there. | deelan, | in person |
| ee kaná een, | on this side. | ēngar, } | near. |
| oo kaná een, | on that side. | nere, } | |
| dahne, | to the right. | pe, | on. |
| deren, | to the left. | sánmoo, } | in front. |
| sáme, | in front. | muhran, } | |
| páchhe, | behind. | sadámat, | always, |
| jaldee, | quickly. | gujárath, | by the hands of. |
| haren, | slowly. | hoke, | viâ. |
| lo, | up to, till. | dheer se, | slowly. |
| ko, kee, | of. | bilát, | much. |
| kon, | to. | kabon, | ever. |
| se, | from. | tanak, | a little. |
| parant, | but. | darak, | sometimes. |
| kabe, | when? | baryánee, | violently. |
| jabe, | when. | babut oo, | much indeed. |
| tabe, | then. | pahlegiude, | on the other side. |
| ákasmát, | suddenly. | aele gi ude, | on this side. |
| áj, | to-day. | nirá, | entirely. |
| kál, | yesterday. | kewal, } | |
| bhyáne, | to-morrow. | nirbak, } | |
| paron, | day after. | agen, | before, |
| naron, | day after that. | páchhe, | after. |
| lánen, | for. | se, | than. |
| saetmaet, | gratis. | kaját, | if. |
| nit nit, | daily. | athae, | in the evening. |
| murak, phir, | again. | darobast, | altogether. |
| ánge, | formerly. | bánokee, | quickly. |
| abe, | now. | kanáee, | on the part of. |
| azpher, } | roundabout. | Rám dhu- | by Ram, for Ram's |
| gerger, } | | wai ee, } | |
| hou, | yes. | Thákur } | by God (patron or lo- |
| anhán, | no. | sonh, } | |
| bigar, | without. | woa, | and. |
| chánhen, | or. | sakáro, | early in the day. |
| káe, | what is it? | | |

List of Verbs that differ from the Oordoo.

| | | | |
|---------------|--|-------------------|--|
| ringbo, | to proceed. | márbo, | to beat. |
| ábo, | to come. | bhoojbo, | to roast. |
| jebo, | to go. | udhelabo, | to pour. |
| terbo, | to call. | chedbo, | to prevent. |
| batebo, | to speak. | lám bandebo, | to concentrate a force. |
| lukabo, | to hide. | chhoochhee | } to fire blank am- munition. |
| mádbo, | to knead. | toofak-ghálbo, | |
| leábo, | to bring. | band karbo, | to prevent. |
| rákhabo, | to put. | latak jebo, | to return. |
| uthbo, | to rise. | galá phásbo, | } to hang one-self. |
| banábo, | to cook. | garsentee debo, | |
| tođbo, | to break. | lab debo, | } to make specious promises. |
| khujábo, | to scratch. | bálá debo, | |
| batebo, | to speak. | khebo, | to ply a boat. |
| ench lebo, | to abstract. | khaebo, | to eat. |
| oll devo, | to imprison. | páta debo, | } to finish, settle. |
| bán lebo, | to take a hand or wrist (protection.) | níptádebo, | |
| hat karbo, | to insist on. | talab karbo, | to demand impera- tively. |
| gamm | } to wait. | bitarbo, | to distribute. |
| khebo, | | peecho ho jebo, | } to die. |
| cheenbo, | to recognise. | pás jebo, | |
| dheer dharbo, | } to be silent. | leelbo, gutakabo, | to swallow. |
| monge rahbo, | | disá hobo, | } to ease one-self. |
| usebo, | to boil. | farákat hobo, | |
| baebo, | to sow. | matyábo, | to rub earth on the hands previous to washing. |
| udelbo, | to pour. | karoola karbo, | to rinse the mouth. |
| kapabo, | to tremble. | kalebá karbo, | to breakfast. |
| ripatabo, | to slip. | pharbo, | to bear fruit. |
| rupabo, | to wait. | simit rahbo, | to contract from fear. |
| jánbo, | to understand. | | |
| le jebo, | to carry away. | | |
| uthábo, | to raise. | | |
| baithbo, | to sit. | | |

Vocabulary of Nouns.

| | | | |
|--------------|-------------|-------------|-----------------------|
| halko, | light. | •nennoo, | butter. |
| garaw, | heavy. | goras, | (cow-juice) milk. |
| buro, | bad. | mathá, | butter-milk. |
| achho, nono, | •good. | hadiyá, | cooking pot. |
| patro, | thin. | páro, | cover. |
| motho, | fat. | sil, | mortar. |
| pakko, | } strong. | ludiyá, | pestle. |
| neechat, | | karaiyá, | tin. |
| bejár, | ill. | seeso, | lead. |
| bado, | large. | peetar, | brass. |
| choto, | small. | lodee, | soft part of the ear. |
| lamon, | long. | tarwa, | sole. |
| chonro, | broad. | piduree, | calf. |
| peda, | tree. | ghoote, | knee. |
| bitiyá, | girl. | kurchee, | ankle. |
| ágee, | fire. | táree, | palm. |
| purwá, | a hamlet. | teonee, | elbow. |
| chonbaro, | a rat. | kabjs, | arm, above elbow. |
| sánp, | a snake. | kandhá, | shoulder. |
| parrwá, | pigeon. | ghitkee, | windpipe. |
| batero, | quail. | dádee, | chin. |
| bighana, | wolf. | bironee, | eye-lash. |
| náhar, | tiger. | tope, | eye-lid. |
| tiduá, | leopard. | pág, | turban. |
| sreeghos, | panther. | konro, | soft. |
| ker, | plastrain. | karro, | hard. |
| gádar, | sheep. | sonsar, | smooth. |
| medo, | a ram. | bheenjo, | wet. |
| gaiyán, | cow. | bár, | hair. |
| bael, | bullock. | kakwá, | locks of hair. |
| jawá, | barley. | choondaiyá, | top-knot of hair. |
| dastá, | pewter. | kankaree, | arm-pit. |
| kbánd, | sugar. | kwámee, | virgin. |
| cheenee, | soft sugar. | ránd, | widow. |
| nakareeyá- | } wood. | muns, | husband. |
| káth, | | litár, | forehead. |

| | | | |
|-----------|-----------------------|-----------------------|------------------------------------|
| káro, | black. | lapká, laparhá, | active. |
| leelo, | blue. | sarick, | enemy. |
| hareero, | green. | khuns, | anger. |
| chandá, | } moon. | allball, | shuffling. |
| chandrmá, | | káchee, | a gardener. |
| tarainyá, | star. | dheemar, | a bearer. |
| baehar. | wind. | káith, | Hindu-vee writer. |
| bagroodo, | dust-storm. | bádar, | cloud. |
| ujyáro, | light. | chipee, | a tailor. |
| gehro, | deep. | ladiyá, | mason. |
| borá, | dumb. | hiráno, | stray (animal.) |
| bihro, | deaf. | aber, kubera, | delay. |
| lolo, | lame with both legs. | chaprá, | sealing wax. |
| kanwán, | blind of one eye. | pátee, | note. |
| cháro, | grass. | badalo, | answer to letter. |
| sufet, | white. | sikhápan, | instructions. |
| ánand, | pleasure. | bideewár, | stating particulars. |
| pirát, | pain. | lág, | provisions. |
| kuwá, | well. | milak, | black mail. |
| gael, | road. | giláwo (khaban,) mud. | |
| palechá, | saddle. | seho, | waterfall. |
| páero, | stirrup. | soondo, | island. |
| mohrá, | headstall. | dáng, | jungle. |
| har, | plough. | lugye, | woman, wife. |
| jooná, | yoke. | sáre, | brother-in-law. |
| kudáree, | pick-axe. | dukará, | old man. |
| haseeyá, | sickle. | dukariyá, | old woman. |
| toriyá, | hillock. | sasurár, | village of father-in-law. |
| bakalá, | bark. | | |
| dár. | branch. | mamyáro, | ditto of maternal uncle. |
| soodho, | straight. | | |
| ondo, | upset. | samdhyáno, | ditto of son's father-in-law. |
| irádab, | corruption of ilákah. | | |
| saksee, | ditto of sakhtee. | máiko, | village of married woman's mother. |
| kissah, | quarrel. | | |
| sahsá | injustice, mistake. | bikat, | difficult. |
| kumak, | anger. | moorá, mooree, | reddish. |

| | | | |
|-----------------|--------------------|------------|-----------------------|
| judhaiyá, | moonshine. | siyánee, | grown up(daughter.) |
| nyáo, | quarrel. | jablo, | former. |
| thanwár, | horse-keeper. | bintee, | petition. |
| baredee, | cow-herd. | suja, | fame, |
| cheree, } | goat. | newto, | congratulation, a |
| chiriyá, } | | | guest. |
| gadariya, | shepherd. | Choumás, | 4 months, rainy sea- |
| pardanee, | man's dhotee. | | son. |
| pidee (méchee), | chair. | bhánware, | the day on which the |
| ghám, | sunshine. | | bride is handed |
| lapat, | hot wind. | | over to the bride- |
| gagrá, | earthen pitcher. | | groom. |
| nád, | earthen tub. | oognee, } | the day on which the |
| likhaiyá, | writer. | ágonee, } | Barát arrives. |
| jhanjiree, | lattice work. | Barát | bridegroom's party. |
| nattet, | relation. | khadán, | mine of diamonds. |
| nátedár, } | relation. | marwá, | first day of marriage |
| ristedár, } | | | ceremonies. |
| adá, | place of dwelling, | náoo, | a barber. |
| | refuge. | náw, | name? |
| kamtána, | work, building. | nánw, | a boat. |
| eek deel, | one person. | dondá, | a cause. |
| deelan, | in person, | sároo, | each of two men who |
| badkáo, | conversation. | | have married sis- |
| maksad, | consultation. | | ter'sis to the other. |
| purt, | secret. | bahu, | son's wife. |
| dát, | key to plunder. | damád, | daughter's husband. |
| dugaiee, | verandah. | jet, | husband's brother |
| lábree, | falsehood. | | (elder.) |
| chbán, } | enquiry, justice. | dewur, | ditto ditto (younger) |
| tadarak, } | | nand, | ditto sister (older.) |
| bakree, | walled dwelling. | bábájoo, | ditto father. |
| nonee, } | good. | bhabhájoo, | ditto mother. |
| kbáso, } | | baiyah, | — sister (younger.) |
| sáha, | honest man. | baijoo, | ditto elder sister. |
| baramná, | anxiety. | Parwá, | small village. |
| penkará, | fetters. | k,hero, | few huts. |

| | | | |
|------------------|------------------------|-------------|---------------------------------|
| gánw, | village. | patureeá, | musulman concu- |
| sahar, | town. | | bine. |
| náro, | nullah (rivulet.) | pero, | a tree. |
| báj k,hyee, | suddenly happened. | houldir, | } mad, crazy. |
| jeto, | elder brother. | sirree, | |
| majhlo, | 2d ditto. | behá, | |
| sajhlo, | 3d ditto. | págil, | } man. |
| lohro, | younger ditto. | mánas, | |
| kaká, } | father's brother. | manukh, | |
| peetee, } | | behuro, | creditor who lends mo- |
| phuwá, | father's sister. | | ney. |
| ajá, | father's father. | tiháiee, | $\frac{1}{2}$ instalment of re- |
| ájee, | father's mother. | | venue, sáwan, aghan, |
| mámá, | mother's brother. | | chait. |
| mosee, | mother's sister. | khojnamah, | search. |
| naná, | mother's father. | pattá, | trace (of marauders.) |
| nánee. | mother's mother. | bheer, | force, party of armed |
| saráj, | wife's sister (elder.) | | men. |
| sáree, | ditto (younger.) | ján chinár, | acquaintance. |
| bhateejo, | brother's son. | lekbá, | writing, accounts. |
| bhánej, | sister's son. | tál, | rank. |
| | ditto daughter. | athye, | assembly of villagers |
| bhyee, (brother) | kaká's son. | | in consultation. |
| | phuwá's ditto. | medo, | boundary (near.) |
| | mámá's ditto. | dot, | inkstand. |
| | mosee's ditto. | jurdán, | writing materials. |
| jareenámah, } | } fine. | rabáb, | } custom. |
| mámlo, | | rawye, | |
| dáur, | | Thakuriyá, | a thákur, |
| bast, | thing, article. | dánkoo, | a marauder. |
| k,haleetá, | pocket. | rakhoe, | levying troops. [lands. |
| bhojye, | brother's wife. | punyárthee, | the enjoyer of charity |
| karro, | stiff. | Bamanye, | matricide, suicide, &c. |
| kajureeá, | young wheat grown | | committed by a bra- |
| | in pots and thrown | | min, &c. in supposed |
| | into the tank on the | | self-defence. |
| | last day of Sáwan. | táns, | reprimand. |

| | | | |
|------------|---|--|---|
| sanad, | ready. | dándas | oppression. |
| diwáro, | door. | •chutkee, | a note. |
| mood, | head. | khám, | envelope. |
| thar, | head (of cattle.) | lakhotá, | wafer or gum which closes a letter. |
| pandá, | a cook. | teeto, | damp. |
| padiyá, | young buffaloe. | khaprá, | a title. |
| usareeyá, | a little larger one. | tál, | } tank. |
| báro, | a child. | talaiyá, | |
| dor, | cattle. | cheep, | slate. |
| prasang, | conversation. | • dundee, | marauding. |
| gujáráth, | by hands of. | dundet, | marauder. |
| Prohit, | family priest, (a bra- min.) | setee, | whistling. |
| kewat, | boatmen. | bekh, | dress. |
| hád, | boundary (far.) | machree, | fish. |
| bukra, | a tax fixed, and half levied, by the chief in whose territory a widow (of all but the four principal castes) first married from the man who intends to keep her. | badmásee, | disturbance of peace. |
| Pichorá, | ditto, $\frac{1}{2}$ ditto where born | banjee, | a banyan's traps haw- king about. |
| | ditto—N. B. The chief does not give the widow without her consent, and she cannot give herself away without his consent. | bhowree, | circuit for hawking or intelligence. |
| | | thát, | a chief's herd. |
| | | bagar, | a villager's ditto. |
| | | nár | } combined village herds. |
| | | rahá,un, | |
| | | altráeeso, | } Histories relating to Bundelkand. |
| | | Prithee | |
| | | ráj ráeeso | |
| | | (to Kano- je,) cha- tur pur- kás, | |
| chakariyá, | (chákar), servant, a sepai seeking em- ployment. | bagáre, | separated. |
| sustye, | absence of suspicion, and care, unprepared | narwá, | streamlet. |
| átas, | fear, dread. | jánabá, | acquainted. |
| | | jhungée | } a tent. |
| | | (ahijdee), | |
| | | pát, | breadth of river. |

| | | | |
|-------------|-----------------------------|--------------|-------------------------|
| chhurá, | razor. | bilát, | many (days.) |
| kathanee, | scissors. | ojee, | one man taking ano- |
| Patwáree, | statistics of a village. | | ther's place. |
| dujágee, | having two masters. | sistácháree, | flattery. |
| barejo, | a pán plantation | sánto, | eatable. |
| sádháran, | easy. | gamm, | ability. |
| katahar, | fruit (jack.) | phuskará, | fawn. |
| lathar, | harsh. | bhuchch, | a jungle man. |
| chíronjee, | seeds of the achar fruit. | galee, | a road. |
| parora, | a vegetable. | párae, | roe. |
| jakká, | concern of mind. | chikrá, | deer. |
| dasee, | a sign, proof. | les, | trace. |
| swám | } fidelity to one's master. | madye, | a man. |
| dharmee, | | dokh, | fault. |
| ásaro, | dependence. | huzooranee, | a concubine given to |
| sapar, | bathing. | | a dependent of the |
| douwá, | title of an Aheer. | | Rajah's, a cast off |
| dháee, | nurse. | | mistress. |
| dhouwá, | ditto's husband, called | Pardwár, | a Hindoo mistress of a |
| | by child dáoo. | | Rajah who lives in |
| Barwáree, | title. | | seclusion (purdah.) |
| kakaroo, | gravel in which dia- | huzooree, | a servant to whom a |
| | monds are found. | | cast off mistress is |
| jamokh, | confronting. | | given to keep. |
| nádar, | dispraise. | Horee, | the Holee festival. |
| khará, | a hare. | Budhwá | } the Tuesday after the |
| laraiyá, | jackal. | māngal, | |
| lukhareeyá, | fox. | panainyán, | shoes. |
| kul, | plenty of. | mihpar, | honey. |
| sarak, | high road. | maen, | wax. |
| kowwa, | crow. | máchho, | honey-bee. |
| kuliyá, | a lane. | machhee, | ditto smaller, fly. |
| diwálo, | a temple. | kontiyo, | ditto still smaller. |
| teep, | written promise to pay | sawád, | caste. |
| | for indemnification | teelee, | the milk of a she-buf- |
| | from plunder. | | faloe just thrown a |
| | | | young one before it |
| | | | has sucked. |
| dohá, | } verses. | | |
| ser, | | | |

| | | | |
|-------------|---|--------------|---|
| kheer, | rice first browned and then boiled in milk. | bharetoo, | a pair of animals. |
| chhimá, | silently. | byá, | weighman. |
| ditto karo, | hold your tongue. | palledár, | a grain porter. |
| kisee ke | } to 'commit suicide on account of another's treatment. | thapareeyá | a slap. |
| oobar | | lateeya, | a walking-stick. |
| marná, | | badaiee, | a carpenter. |
| kadero, | stick maker. | kundero, | a turner. |
| lenroo, | a coward. | lakhero, | worker in lac. |
| nirá, | } complete, entire. | kachero, | worker in kách (glass.) |
| kewal, | | kunjaree, | fruiterer. |
| rasoe, | a meal, food. | barchee, | a footman's spear, mark of a Bundela. |
| bardá, is, | provisions, earthen utensils, firewood, grass, pegs. | nuthehá, | confectioner. |
| rasad, | ditto, atta, dal, &c. | bajáj, | cloth seller. |
| kisán, | cultivator. | chik, | } butcher. |
| misal, | caste, connection. | khateek, | |
| padath, | custom of a caste. | báree, | torch-bearer. |
| upacheer, | } disturbance. | haláleeyá | a sweeper. |
| ucham, | | farás, | to the usual occupation adds that of camel man. |
| deen band, | defender of the faith, (address to a superior.) | chatewree, | painter of figures. |
| parwar, | a vegetable. | baraiee, | pán-seller. |
| kundaroo, | ditto. | josee, | receiver of alms of religious feasts or fasts. |
| non, | salt. | kagdeegir, | paper-maker. |
| najor, | weak. | nabdeegir, | pad-maker. |
| kháro, | salt, (adj.) | cháwar, | rice. |
| karwo, | bitter. | chonr, | chowree. |
| kháto, | sour. | panchhee | } list of birds. |
| meeto, | sweet. | chetáwa-nee. | |
| gureero, | tasting of ghoor. | gahno | } list of jewels. |
| chirparo, | not pungent. | chetáwa-nee. | |
| madheer, | greasy. | phool che- | } list of flowers. |
| etáeelo, | astringent. | tdwane, | |
| garist, | bloating, indigestible. | | |

| | | | |
|-----------|---|---------------|---|
| cháro, | fodder for horses, cows, and buffaloes. | koowa, | a son. |
| gedá, | ditto for elephants. | daskhat, | circumstance. |
| dálee, | ditto for camels. | sarjant, | arrangement. |
| pattee, | ditto for sheep. | dhepan, | office of nurse. |
| beboocha, | taken up with. | dohrá, | door. |
| kaif, | anger. | angochha, | handkerchief. |
| chun, | bird's food. | modlo, | recrimination, repri- sal. |
| ghāne, | crowded together. | duhai,ee, | rule, government. |
| panám, | poor man's salute of a dhámee. | khawás, | { title of a barber. |
| | | samáree, | |
| surág, | tracing of thieves. | ánhán, | no! |
| gonhoon, | wheat. | tanak, | little, least. |
| duhaiee, | rule, government. | seedho, | plain fare, wheat, ghee, salt and dal (rations.) |
| dalidra } | cares and troubles. | kanak, | wheaten flour. |
| daridra, | | tanak, | a small quantity. |
| johukm, | as order, answer to a superior's order. | surág, | tracing of thieves. |
| satyánás, | annihilation, ruina- tion. | larj kee bát, | suspicious expressions. |
| bipat, | cares and troubles. | jhuláhoolo, | twilight. |
| sáwkas, | worldly means. | thádho, | standing. |
| phaldan, | the present sent by the father-in-law to his intended son-in-law, cocoanut, a rupee or mohur, &c. | kuchee, | key. |
| | | táro, | lock. |
| | | akrás, | enmity. |
| | | badeeyá, | { crop-tailed horse. |
| | | bándá, | |
| | | bandá, | raised place to hold wheat. |
| sagaiee, | first entertainment at the son-in-law's house. | khondeeyá, | sunk place to hold wheat. |
| lagun, | the paper containing the appointed wed- ding days. | bár, | hair of men. |
| | | bár, | hair of animal. |
| palechá, | horse's pad. | bár, | wool. |
| gadee, | elephant's pad. | noh, | nail of finger or toe. |
| jaháj, | camel's pad wood. | mekh, | iron nail. |
| palán, | pad do. [rangement. | sum, | hoof. [yawning. |
| bandhej, | livelihood, means, ar- | álas, | inattention, laziness, |

| | | | |
|-------------|--|------------------------|--|
| kus, | a kind of grass. | bichlee, | routed, dispersed. |
| luchaiee, | a cake (pooree.) | sustye, | confidence, absence of apprehension, tranquillity. |
| hetee, | a friend. | | |
| Be,uháree, | an equal in society of a different caste. | sudhár, | advantage, benefit. |
| barbast, | fee for jageer. | choakhtá, | enclosure, gate. |
| bandej, | preparations, arrangement. | hirmijee, | cochineal colored (kirmizee, Persian.) |
| barbas, | oppression, extortion. | pahoonaee, | guest for some time. |
| pooro, | even. | byáree, | dinner after sunset. |
| oono, | odd. | dataon, | vegetable tooth-brush. |
| swáhá, | amen, empty, echo of another's sentiments. | kariyá, | black complexion. |
| chunduwá, | bald-headed. | sávroa, | dark do. |
| basor, | basket-maker. | goahoowá } baran, } | wheat colored ditto. |
| bákhar. | enclosed dwelling. | goroa, | fair ditto. |
| kachwáro, | kitchen garden. | bhoorá, | white, European ditto. (leper-like.) |
| bheda, | } vegetable. | bhatá, | tomatus. |
| bhendee, | | khámeendá, | authentic, competent, (authority). |
| both, | swell of river. | bát, | award, a sentence. |
| pasopes, | indecision. | tapurs, | entrusted. |
| oot patank, | wild schemes or sayings. | daskat, | syllable, hand-writing. |
| mahago, | dear. | bihee, | guava. |
| sasto, | cheap. | pachhyáur, | curds sweetened with goor. |
| bardán, | blessing, favor. | sádee, | cream. |
| seeng, | horn of animal. | behar, | a well with steps. |
| sáwdhán, | intelligent. | báree, | garden ground enclosed with thorns. |
| amasee, | mixed (Ban) amez. | chitáse, | spotted. |
| toonká, | chip. | thor, | head-piece. |
| Bahduwá, | a prisoner. | ato, | hindrance, draw-back want of completion. |
| gháil, | wounded. | dámar, | a continued thick jungle. |
| wafic, | conversant. | | |
| sahná, | revenue collector for village. | | |
| mukálabo, | confronture. | | |
| salákhán, | ruler. | | |

| | | | |
|------------|------------------------------------|------------|-----------------------------|
| thakuráin, | wife of a thakoor. | baráee, | } sugar cane. |
| áns, | "tuhmat." | ookh, | |
| kujas, | ill fame. | gulcháh, | false rumour. |
| kunnas, | } salutation, (low). | bhatiyá, | hillock. |
| mujrá, | | samaetá, | assembly. |
| moos, | loan. | galgal ni- | } lemon. |
| gael, | a road. | muwá. | |
| unsár, | inkling. | beuhár, | return wedding present. |
| tipañiyá, | basket. | phaká, | piece of any thing divided. |
| madeee, | "mendee." | pisán, | flour of any kind. |
| khobá, | milk boiled to a thick- ness. | beero, | brother. |
| oatbo, | to fry milk to a con- sistency. | phar, | fruit. |
| jaraeta, | thorns. | sadáwart, | permanent alm's fund. |
| boal, | a runner, creeper. | | |

N. B.—Few or none of the words have been entered that were not first actually heard in conversation

The Vocabulary could of course be added to, by those who have had the advantage of a longer residence than I had in Bundelcund.

| | |
|--------------------------------|------------------------------------|
| Logan ke nárdáns mens surwáran | Conceal the swords in the people's |
| ko bede á,o, | gutters and return. |
| Parná kee khabar ko kachhu | There is no dependence on the |
| bhádo naee, | Punna news. |
| Ham athai ka bhanhan, | I will eat this evening. |
| Rotee bhát hai, | He is eating bread. |
| Kadáchit sarkár ho mánas Jeit- | Would the Jeitpoor man kill a |
| poor wáran ke háth á jenhen to | government servant were he to |
| be már dáshen, | fall into his hands? |
| Ko Thákur hai, | What caste are you. |
| Rájá kee bhet to nahoochen, | You may not have seen the Raja. |
| Hamáro nará Lodee men gado | Lowri is the place I (literally my |
| hai, | naod) sprung from. |
| Ute reháo kare, | Continue to remain there. |

Ambalah, 31st December, 1843.

A note on the Winds, as influencing the Tracks sailed by Bermuda Vessels; and on the advantage which may be derived from sailing on Curved Courses when meeting with Revolving Winds. By Lieut. Col. REID, Governor of Bermuda.

It may at first sight appear, that we in India have little to do with "the Tracks sailed by Bermuda Vessels;" but further consideration will shew to those who have paid attention to this subject, that not only as a general question of science, and a new and beautiful practical result of theory and research in this new branch of Meteorology, but also as being capable of extensive application in our own seas to the Eastward of the Cape, this paper merits the closest study: for it is much more than probable, that future research will shew us, that by an analogous system, the great storms of both Southern and Northern latitudes may all be used as means of shortening voyages by the simple rule of sailing, partly round their circumferences, or keeping in their favourable quadrants, instead of beating across or lying to in them, or pursuing tracks which lead into meeting with them "on their wrong sides," in the latitudes in which they prevail. We are indebted to Col. Reid for a copy of this valuable note.—H. P.

In high latitudes the atmospheric currents, when undisturbed, are westerly, particularly in the winter season. If storms and gales revolve by a fixed law, and we are able by studying these disturbing causes of the usual atmospheric currents, to distinguish revolving gales, it is likely that voyages may be shortened.

The indications of a revolving gale are, a descending barometer with a regularly veering wind.

In a voyage from Bermuda to New York in the winter, strong westerly winds, together with the Gulf Stream, would carry vessels attempting to sail direct to New York, to the eastward of their course. No doubt all seamen are aware of this, and do in consequence make some allowance by keeping to the westward. But according to usual practice, on an east wind overtaking them, they would steer in a direct course for their destined port, making allowance only for the current, as the wind would be considered a fair one. If however the gale were a revolving one, the wind, at first easterly, would veer until it became westerly: and would probably blow from the westward with increased force, when the vessel would be carried off her course. It is therefore a subject deserving consideration whether advantage should not be taken of the temporary east wind in order to run to the westward nearly as far as the meridian of Cape Hatteras; so that in the rest of the voyage to New

York, the chance of reaching that port would be the same as that of coasting vessels in their voyage from the Carolinas.

But should a dry easterly wind set in, and the barometer maintain its mean height, or rise above it, the case would be altogether different; for these would be indications of a steady wind, and not of a revolving gale. The ship may then be steered direct for the intended port; and this shews that the hygrometer might prove a useful instrument at sea, though not hitherto used that I am aware of, in aid of navigation.

Since vessels sailing from Bermuda and bound to New York, or the Chesapeake, must necessarily cross the Gulf Stream, they will have an advantage in doing so before that stream begins to set strongly to the eastward. For this reason, as well as to have a better chance of getting to the westward, it would seem advisable on first leaving Bermuda, to make no *northing*, but if the wind should at the time blow, for example, from the north-west, to sail free upon the starboard tack, and to keep on this tack, until the vessel be so far advanced as to fall into the northerly current of the Gulf stream; and this might prove to be the best course to pursue, even should the ship for a time make *southing*. The more southerly the port to be gained, as for example, Baltimore, the more does it appear advisable that this should be persevered in. The same principle of sailing for Boston and even for Halifax, (though in a much less degree) might be found to be that by which the most certain course would be secured. It may appear unreasonable to propose, that a ship bound to a port to the *northward*, should on leaving Bermuda, steer *southerly*—yet when we shall be better acquainted with the causes of the variable winds, and their changes, this may really not appear to be so unreasonable.

For example, towards the end of a revolving gale passing over Bermuda, the wind may still be west, and blowing hard. Since the courses of such gales are northerly, a ship by steering north would only continue the longer in the same westerly gale, whereas by steering southerly, the ship and the storm would be moving in opposite directions, and the vessel would the sooner have the chance of falling into a new variation of the wind. Sailing southerly, on the starboard tack, the latter end of such revolving gales as the one supposed above, might (as frequently happens) veer to *west-north-west* and even to *north-west*,



which would enable a ship to come up and make a better course towards the west.

These suggestions are offered to practical seamen, in the hope that some persons will be induced to consider this subject; and if gales really revolve, that advantage may be taken of their mode of action.

In sailing from the West Indies to Bermuda in the winter season, the trade wind will generally enable vessels to gain a meridian, sufficiently to the westward, before they leave the latitudes where it usually blows; and in winter, it would seem desirable to make the 68th or 70th degrees of west longitude, before leaving the 25th of latitude.

In voyages between Bermuda and Halifax, in the winter season, the same reasons hold good for keeping to the westward, as have been recommended for the passage from the West Indies to Bermuda, but in a much greater degree; for in this latter case there is not the easterly trade wind to carry ships to the westward.—On the contrary, the west wind may blow throughout, whilst the Gulf Stream also would tend to set vessels to the eastward. The degree of westing to be made in this passage in the different seasons, does not seem to be agreed upon.

The chief object however of this note is to point out the benefit which may be derived from profiting from the east wind, which blows on the *polar* side of a revolving gale, before the wind shall veer to the westward.

On leaving England for Bermuda, instead of following the usual practice of steering straight for the destined port, on the setting in of an easterly wind, it deserves consideration whether ships should not sail *west*; and if the wind should veer from the east by the south, towards S.S.W., S.W., and West, whether they should not continue on the larboard tack, running free, until by changing, they could lie their course.

The wind after this might continue to veer towards the north, so that the ship might still come up, with her head to the westward of her direct course. On both tacks she would have sailed on *curved lines*, the object of which would be to carry her to the westward against the prevailing wind and currents.

The east wind which sets in at the commencement of a revolving gale, may veer either by the north or by the south, according as a ship may be situated in the right or the left hand side of a progressive whirlwind; but the westerly wind of high latitudes will neutralize the effect of this east wind, when it does not blow hard, so that it may sometimes produce a calm.

For example, if the wind's force in a whirlwind be represented by the number 4, and the force of the general atmospheric current of air blowing at the same time, be also represented by the number 4, the east wind in the whirlwind will be balanced by the general west wind prevailing beyond the limits of the whirlwind; but on the opposite side of the whirlwind, the wind's force will be doubled, so that it may be equal in strength to a gale. This is supposed to be the explanation of westerly gales in high latitudes blowing harder than easterly ones.

A ship's best course from England to Bermuda therefore, may neither be by the straight course, nor yet one by the trade winds, but it may sometimes be in a curved direction to the northward.

The principle of taking advantage of the changes of revolving winds, by sailing free on curved lines, is applicable to high latitudes, in both hemispheres, when ships are sailing westerly. W. R.

GOVERNMENT HOUSE, BERMUDA,

11th May, 1842.

Proceedings of the Asiatic Society.

Wednesday Evening, the 6th December, 1843.

The usual Monthly Meeting was held at the Society's Rooms, on Wednesday Evening the 6th instant.

H. Torrens, Esq. Vice President in the chair.

The following new Members proposed at the last Meeting, were balloted for and declared duly elected:—

Lieutenant Hickey, 1st N. I. and Willis Earle, Esq.

Associate Member.

The Rev. W. J. Long.

*Corresponding Members.*

Mons. C. Alex. Challaye, late French Consul in China.

Mons. M. H. E. de Chonski, Secretary of the Consulate in China.

And the following new Member :—

R. Macdonald Stephenson, Esq. was proposed by Col. Forbes, and seconded by H. Torrens, Esq.

The Secretary reported to the Meeting, that the reprint of Lieut. (now Major) Leech's Grammar and Vocabulary of the Beloochee and Punjabee languages, which had been requested by the Right Hon'ble the Governor General, was completed, and the Government copies sent into the Foreign Secretary's Office. Spare copies had also been struck off for the Society, and were now on the table.

Also, that the Library contained only the Philosophical Transactions up to the year 1837, although it appeared from a printed list in the work that the Asiatic Society of Bengal, was one of the public bodies with which the Royal Society exchanged Transactions. He therefore requested to be authorized to write to the Royal Society on the subject; which was agreed to.

The Vice President introduced to the Meeting, Messrs. C. Alex. Challaye, late French Consul in China, and H. E. de Chonski, Secretary to the French Consulate at Canton, as Members of the Société Asiatique de Paris, and themselves Orientalists of much merit. These gentlemen were now on their way to Europe, and he proposed from the chair, that they should be elected Corresponding Members of the Society; which was unanimously carried.

Mons. Challaye presented to the Society a copy of the work of the Rev. Pere Callery, Missionaire Apostolique in China, entitled "*Systema Phoneticum Scripturæ Sinicæ*," as also two specimen numbers, in French and English, of his proposed translation of the great Chinese Encyclopedic Dictionary of Kang-hi, known hitherto to Europeans only through the translation of its abridgement, entitled *Kang-hi-tze-tien*, by Dr. Morrison. For the proposed translation of the entire Encyclopedia by M. Callery, the patronage of the Society was requested.

The Vice President after detailing at some length the indefatigable labours of the Rev. M. Callery, in the publication of his first work, the *Systema Phoneticum*, which was mostly performed, down to the meanest details, by his own hands, rendering it thus also a monument of the untiring energy of a man of genius, referred to the specimens of the new work on the table as one in the highest degree worthy of the

patronage of the Society. He much regretted the absence of the Honorable the President, as he thought he would doubtless have earnestly supported the proposal he intended to make, which was, that the Society should subscribe for two copies of the Encyclopedia, and address Government, requesting also that its support be accorded to M. Callery's most useful and honourable enterprise.

The Sub-Secretary thought that the absence of the Honorable the President was scarcely to be regretted, as any proposal to Government now carried, would thus come more independently from the Society, as a body, in his absence. He observed, that it was scarcely possible sufficiently to appreciate such an undertaking, since at the present moment no Englishman could be indifferent to any work, great or small, which could throw any light whatsoever on any matter relative to China or the Chinese.

Some conversation ensued, when it was elicited, that (as stated in the preface,) the work will extend to 20 Volumes of 600 pages each, royal octavo, and the price will be 25 francs per Volume. It was proposed by the Vice President, seconded by Mr. Heatly, and carried unanimously, that the Society should subscribe for two copies, and that it should be referred to the Committee of Papers to frame a letter for the approbation of the Society at the next Meeting, in which the support of Government might be solicited for this important work.

The Vice President brought to the notice of the Meeting, that it had been long considered by many Members of the Society, that the Busts were placed in far too elevated a position, and that it would be proper to lower the pillar-pedestals on which they stand, so as to bring them to the usual height at which Busts were placed. He also submitted to the Meeting, a specimen Slab on which it was proposed to inscribe the names of the persons whose effigies were represented, placing it against the pillar beneath the Bust; but he stated, that as some difference of opinion might arise as to the proper mode of inscribing the name, he begged to submit the question for the decision of the Society.

After some conversation, it was agreed upon, that a Committee to be composed of

N. B. E. Baillie, Esq.

F. G. S. Heatly, Esq., and

H. Piddington, Esq.

be requested to settle this matter.

The Secretary also stated, that as a reprint of the Lithographed Rules of the Society which were distributed to new Members was necessary, he was desirous of know-



ing if it was the pleasure of the Society that any alteration should be made in them.

Referred to the Committee of Papers for report.

The following list of Books presented was read :—

Books received for the Meeting of the Asiatic Society, on the 6th December, 1843.

The Calcutta Christian Observer, November and December 1843, New series, vol. iv. Nos. 47 and 48.—Presented by the Editor.

The Oriental Christian Spectator, new series, Bombay, November 1843, vol. iv. No. 11.—Presented by the Editor.

The Calcutta Journal of Natural History, April 1843, vol. iv. No. 13.—Presented by the Editor.

Journal of the Agricultural and Horticultural Society of India, 1843, vol. ii. No. 9. Presented by the Society.

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. i. Nos. 20, 21, 22 and 23, November and December 1842, and January and February 1843.—From the Society.

Report of the Twelfth Meeting of the British Association for the advancement of Science, for 1842. London, 1843.—From the Association.

Papers regarding the Scinde and Begaree Canals, in the Neighbourhood of Shikarpore, in Upper Scinde. Calcutta, 1843.—From Government.

The Zoology of the Voyage of H. M. S. Sulphur, Mammalia, by J. E. Grey. London, 1843.—Purchased.

Proceedings of the Zoological Society of London, 1842, part x.—Presented by the Society, through Dr. McClelland.

List of the Fellows and Honorary Members &c. of ditto ditto. London, 1842.—Presented by the Society, through Dr. McClelland.

Memorandum upon the state of Indian Bazaar Weights and Measures. Calcutta, 1843.—Presented by Mr. Landers.

The following Letter from the Librarian, with its accompanying documents, was read :—

To H. TORRENS, Esq. Secretary, Asiatic Society.

SIR,—Having examined the rules of the Society's Library, printed in the 16th volume of the Asiatic Researches, I have the honour to state, that with a few exceptions, they fully answer their intended purpose of preserving the books without inconvenience to the Members of the Society; but as it appears from the Library records, that those rules which provide for the safety of the books have never been adhered to, I beg to suggest the propriety of now enforcing them, and to propose the following alterations and additions :—

I. Books are to be borrowed by written or personal application to the Secretary: in either case, the person applying is to furnish a written receipt, specifying the name of the work, and the time for which it is borrowed; at the expiration of which, he is to return the Book borrowed, or renew his application for an extended loan of it.



This form of the rule is, I think, preferable to the former, it being more regular to fix a certain period for the keeping of the books, and also as it does not exclude other Members from the use of a particular work.

II. To add the following rules:—

1. The Librarian should be authorised to call in any work which is detained beyond the time fixed by the preceding rule.

2. All works, borrowed from the Library, should be returned once a year, viz. the first of October, in order to enable the Librarian to have the most efficient control over them, and to report to the Secretary on the state of the Library.

3. Valuable manuscripts should not be removed from the Library, and no work of the Oriental division of the Library should be borrowed by Native gentlemen, not Members of the Society, without a special order of the Secretary.

In conclusion, I would propose, that the rules of the Library be printed and annexed to the Catalogue.

I have the honour to be, Sir,

Asiatic Society, 14th October, 1843.

Your most obedient servant,

G. ROER.

Memorandum by the Sub-Secretary.

With reference to new arrangements respecting the Library, I beg on the part of the Curators to suggest, that some rule like the following be laid down for the guidance of the Librarian, and for assuring to the Curators that control over the books which are specially required for their several departments, without which they must be seriously impeded, and may often be totally stopped in the progress of their labours.

“Rule.—All books being books of general or special reference in the various branches of Natural History, in the departments of the Zoological, Geological, and Mineralogical Curators, to be understood by the Librarian to be books of reference for the use of those officers, and as such, not to be lent out of the Library.

“The Curators are farther to be allowed to take over for daily use, such books as they may select for that purpose, giving the usual receipt to the Librarian.”

The motive for this rule is, farther, not only to assure to the Curators the use of books often bought specially for their use, but moreover because there is no question, not only that books of daily reference to the working Naturalist are in a manner almost appropriated and kept for months, and even years, by parties who often make but little use of them, but that such works often disappear entirely from the Library;—this has certainly occurred with books relating to my own department, and which I cannot now obtain in Calcutta.

H. PIDDINGTON,

Sub-Secretary and Curator Museum Econ.

Geol. and Mineral. Geol. Dept. &c.

Memorandum by the Secretary.

I have the honor to submit a new Rule for the Library, having special reference to the class of works ordinarily required by the Curators to the Society in the course of their labours.

Hand books and text books of science should evidently be kept in the reach of parties actively engaged in Scientific investigation. For this purpose they either be detained in the Library as proposed, or, as opportunity occurs, procured in duplicate, one copy being always reserved as the Museum copy.

H. TORRENS,

Vice President and Secretary, Asiatic Society.



I should just venture to suggest, that for the volumes specially entrusted to the Curators, in cases where no duplicates exist, the Curator may be permitted to lend them out to Members on a receipt to himself, as it will then be in his power to call them in as soon as he likes.

S. G. T. HEATLY.

Resolved—That the proposed amendments be adopted as the future Rules for the Library.

Read the following Letters from Government, accompanying the Books and Papers to which they refer:—

No. 2556.

From Under-Secretary to the Government of Bengal, to H. TORRENS, Esq. Secretary to the Asiatic Society, dated Fort William, 13th October, 1843.

SIR,—I am directed by the Deputy Governor of Bengal, to forward Copy of a Letter from the Superintendent of Marine, No. 591, dated the 23d ultimo, and its original enclosures, relative to the corrosive effects of Salt-water on Iron, with His Honor's permission for the publication of the whole, or any part of the information therein contained, on this highly important subject.

I have the honor to be, Sir,

Your most obedient servant,

CECIL BEADON,

Under-Secretary to the Government of Bengal.

No. 241, of 1843.

From W. EDWARDS, Esq. Under-Secretary to the Government of India, to the Secretary to the Asiatic Society, dated Fort William, the 3d November, 1843.

Foreign Department.

SIR,—I have the honor to transmit for the use of the Society's Library, the accompanying Copy of Papers regarding the Scinde and Begaree Canals in Upper Scinde, printed by order of the Right Hon'ble the Governor General in Council.

I have the honor to be, Sir,

Your most obedient servant,

W. EDWARDS,

Under-Secretary to the Government of India.

No. 1034.

From Under-Secretary to the Government of Bengal, to H. TORRENS, Esq. Secretary to the Asiatic Society, dated Fort William, 13th November, 1843.

Revenue.

SIR,—By direction of the Deputy Governor, I have the honor to forward for such use as the Society may wish to make of them, the accompanying Papers relative to the variation of the Compass throughout the Bengal Presidency.

2. You are requested to return the Documents in question, when no longer required.

I have the honor to be, Sir,

Your most obedient servant,

CECIL BEADON,

Under-Secretary to the Government of Bengal.

Read the following Letter from E. C. Ravenshaw, Esq. accompanying a sketch of the Image to which it refers:—

To the Secretary of the Asiatic Society, Calcutta.

SIR,—I have the pleasure to send a copy of an Inscription on the back of a small brass Image, about six inches high, which was recently found at Bodh Gya, by the Mohunt of the Monastery of the Sunyasis, while making excavations among the ruins of the Old Fort. The writing is illegible by the scholars of these parts, but it is probable that some of the eminent Pundits employed by the Asiatic Society may be able to decypher it. If they should be successful in so doing, I shall feel much obliged by your favoring me with a translation, as it would be very interesting to ascertain the precise date or æra in which these images of Bodh or Mohamuni were made and worshipped.

Your obedient servant,

Gya, November 19, 1843.

E. C. RAVENSHAW,

P. S.—The Tiara on the head of the Image is very peculiar; a Sketch is enclosed.

The following was the rendering, in Sanscrit characters, of the Inscription by the Society's Sanscrit Librarian:—

श्रीब्रह्मवरदहेतुश्यामलदम्भाय ॥

RASMOHUN NAYAVAGISH,

Sanscrit Librarian, Asiatic Society.

And the following in English and Sanscrit is given by Baboo Saroda Presad:—

श्रीब्रह्मवरदहेतु सामन्त्र दे [व ?] स्यायं ॥

Brahma Varoda hetú Sámanta Devasyāyam.

Literal Translation.

This (this image) is of Sámanta Deva, who yields blessings for Brahma, (for obtaining true divine knowledge,) and who is the cause (or source) of Brahma (or extinction in Brahma,) i. e. salvation.

NOTE.—Here the word Brahma has two meanings; viz. True divine knowledge and extinction in Brahma, or the supreme creator, i. e. salvation.

Besides next the letter दे dé, one व B-a is indispensably necessary to be inserted, as without it no sense can come out.

The character appears to be the character of the 9th Century.—S. P.

Read a Note from Major Ouseley, Agent to the Governor General, North-West Frontier, forwarding a skin of the black Leopard, which he states, is considered a novelty in that neighbourhood, i. e. Chota Nagpore.

Read Letter from Captain Russell, Commanding the Honourable Company's Steamer Ganges, reporting his trip to examine the site of the late Volcanic Island in the Cheduba Archipelago. This letter will be found in the Report of the Curator Museum of Economic Geology, as following there, naturally, the letter of instructions given to Capt. Russell on the part of the Society.



REPORT OF THE CURATOR MUSEUM OF ECONOMIC GEOLOGY.

Report of the Curator Museum Economic Geology and Mineralogical and Geological Departments, for the month of November.

Geological and Mineralogical.—As we have been unable to despatch a scientific geologist to visit the Cheduba groupe as at first recommended, all that could be done was to frame a letter for the Captain of the Steamer, so as to enable him to do the best he could in the way of collecting what he might meet with, and this he has done very zealously. I have but just received his collection, and shall therefore be obliged to delay my report upon it till I learn the localities visited, and other particulars, but the following copy of our letter should be placed upon record:—

Captain RUSSELL, Commanding H. C. Steamer Ganges.

SIR,—As it is not improbable that much preliminary geological, and even some mineralogical knowledge may be obtainable by yourself and Officers on your approaching survey trip to the Straits of Cheduba and adjacent Islands, I have been desired by the Honorable the President of the Asiatic Society, to point out to you briefly, how this may be best accomplished.

Geological.—Your first object is, I believe, to ascertain what traces, as shoals, &c. may remain of the Volcanic Island, which recently rose and disappeared off the S. E. point of False Island, near Cheduba. If the place of the new island can be correctly ascertained, and the water be not too deep, specimens of the scorix and mud should be, if possible, obtained by dredging and diving, with as many shells, stones, &c. as can be had, particularly if with marks of action of fire. A 6-dozen wine chest full of these or more will be none too many, *if there are many kinds*, and the more variety the better.

Whether the Volcanic shoal has any connection with the reef to the South of False Island or not, specimens taken up to the dry reef and the shores of the island, should also be collected; the island itself should be carefully examined and a section of it taken, if possible, numbering or marking all the varieties of rocks, soils and corals, &c. &c. to correspond as A, B, C, &c. The names you give to the stones or rocks, *do not signify in the least*. You may call them any name you like, but the points are *their exact place*, and how the beds of them lie, if the lines of beds can be seen, as thus:—

"L. No. 1 to 7.—Hard blue stone; beds slope with their faces to the S. E. and are elevated about 30° from the sea horizon, the line of the faces of the beds lies N. and S.*

M.—Confused masses of yellow, dark brown, and black stone and boulders with shells, no beds to be made out.

N.—Level beds of soft sandstone much worn by the sea," and so forth: noting *immediately* every specimen or lot of specimens as obtained.

The other small Islands should also be visited and examined in like manner.

Traces of elevations are, according to Captain Halstead, every where to be seen on Flat Island, in beaches of shells at different heights, particularly at "Square Rock," (see his chart.) A good description with plenty of specimens from this rock and the Island would be very desirable. These should be described, measured, and plenty of specimens brought from them, as well as from the present beach; not only to enable us to judge of the number of risings, but also if there have been *sinkings* again between the dif-

* This is called the *dip* and the *strike* of rocks, or mineral beds, or strata.

ferent risings. For these we require plenty of specimens, (two or three boxes full,) both of the rock of the beaches and of the beds of shells, oysters, &c. as found fastened upon and in them, and lying loose upon the ledges, with the various heights marked as nearly as can be measured or guessed. The inland beds, rocks, peaks, &c. are usually the most interesting, as being the most ancient. Any imbedded shells, skeletons of fish, &c. are of the greatest importance.

Mineralogical.—Any veins in the rocks, remarkable stones, ores, &c. should be collected; five to ten specimens at least of each kind.

It appears that a rich Copper ore has been found upon Round Island by a native searching for Coal, employed by Captain Williams, who has been requested to have him ready to accompany you, if possible, to point out the spot. Specimens of the rocks or soil in which, and *with* which, the Copper ore is found should be obtained, as also a good supply of the ore itself, if obtainable. Shining and glittering ores you will readily pick up if met with, but as these are not usually the most valuable, a few of the plain *stone-like* looking ones are sent herewith. All blue, green, red, or yellow stained rocks, cliffs, banks, or veins should be carefully examined; of these the red and yellow are most frequently Iron, and the blue and green often Copper. Spots which appear thus coloured, and nearly or quite bare amongst the surrounding vegetation, should be searched and dug into, and specimens of all the stones, earth, &c. taken. All beds of streams, fissures of rocks and strata, and often the sand and gravel of rivers afford you chances of picking up something of value in this way.

Amongst the specimens you will receive a very small one of a very important, though very worthless-looking one, which is the Asphalte of France, from which the asphaltum terraces and roads are made. This you will easily recognise by its burning, and by its effervescence with acids. Any earthy-looking stones resembling it should be collected; as also specimens of Mineral Tar, if any thing of the kind is found. This is not the petroleum or earth-oil, but a thick, tarry, and almost pitchy substance which has not the smell of the earth-oil, but rather that of leather, but very faint. Where the one of these two mineral products, the Asphalte and the Mineral Tar, is found, the other is most probably present, and should be carefully looked for.

You will receive with the present a printed Pamphlet, containing directions in detail for the collecting of Geological specimens by persons unacquainted with science, in which I have marked a few passages in pencil; these with the foregoing, will, I trust, enable you to add something to our knowledge.

The Asiatic Society of Bengal, will owe you their heartiest acknowledgments, should your search be so conducted as to lead to the collection of a complete set of Geological and Mineralogical specimens from the site to be examined, and I am directed to express the hope of the Society, that you will be facilitated in conducting your search deliberately, by instructions from the Marine Department admitting of some license of interpretation as to the length of time available to you for it?

I have the honor to be, Sir,

Your faithful servant,

H. TORRENS,

V. P. and Sec. As. Soc. of Bengal.

Capt. Russell's Letter to Mr. Torrens is as follows. His chart and report to Government have not yet reached us.



To H. TORRENS, Esq. *Secretary to the Asiatic Society.*

SIR,—I have the honor to state, that the Hon'ble Company's Steamer *Ganges*, after having taken on board the Soogrees of Cheduba and Flat Island, arrived off False Island on the 20th of November, when I took with me the natives of both Islands, who pointed out to me where the Volcanic Island was. I have examined and surveyed the spot, and find it was situated on a continuation of the Reef extending to the Southward from False Island, which is only a sand bank surrounded with rocks, with a few small shrubs on it. Where the Island was, there is now from two and a half to three fathoms water, with the bottom so rocky, that I could not succeed in getting any of it up.

The following is an account of the appearance of the Volcanic Island, by the natives of Cheduba and Flat Island, which occurred on the 26th, 27th, 28th, and 29th of July, 1843:—

“About our morning meal, or seven or eight o'clock, on the morning of the first day, we heard a great noise, and saw fire rising out of the sea, which continued for four days; on the second day we saw a small Island newly formed in the sea, between “Flat Rock” and “Round Rock,” (names will be seen in the chart,) about the size of the sand bank called False Island.

“We saw the newly-formed Island for a month, but could not approach it on account of the boisterous sea on the coast. We felt an earthquake before we saw the fire in the sea; in the month of October we came out in our boats, to look for the Island, but saw nothing. The rocks, as they now lay, are of the same number and position as before the appearance of the new Island.

“We did not feel the earthquake felt at Ramree on the 30th of October last, it was felt on Cheduba Island by some of the natives.”

I am sorry I could not procure you specimens of the bottom where the Island was, as it was hard rock. I was unable to do so, on account of the depth of water,

I have the pleasure of forwarding you a specimen of Copper Ore from Round Island, found by Captain Williams while I was at False Island, and another of Iron I believe, picked up on Round Island by one of the natives; these were the only ones procured on that Island.

I also send specimens of the Rocks, &c. of Flat Island, and the mud thrown out from the Volcano at the same place.

Also a specimen of Iron Ore from False Island, and the different rocks and mud, formed stone there, which appears to me to have been the same sort of mud petrified, as I send specimens of, thrown up from the Volcano on Flat Island.

There are also specimens of Treble Rock to the Southward of where the Volcanic Island was, as you will observe in my chart, forwarded to the Superintendent of Marine.

I also send a specimen of Iron Ore thrown up from a Volcano, about five miles to the Southward of Kyouk Phyoo, on Ramree Island. I regret that I had not further opportunities of gathering specimens, which the shortness of my stay prevented, on account of the Island having disappeared.

I have the honor to be, Sir,

Calcutta, 1st December, 1843.

Your obedient servant,

J. RUSSELL,

Commander of the H. C. Steamer Ganges.

Capt. Boyes of the 6th Cavalry, who it will be recollected was proceeding on a trip to the Himalayan Passes, and was unfortunately compelled to return by the loss of all his baggage down a precipice, has given us new cause to regret this most untoward accident, for he has sent us a most beautiful series of geological specimens as far as he went; viz. a little beyond Melum, and I doubt not that when his Memorandum reaches us, this little collection will be truly an ornament to our Museum. Capt. Boyes has proceeded from the hills to Bundelcund, and I trust, that in that interesting route, he will be able to enrich us farther. It is most certain that zeal and ability abound with him, if he can only find time.

Mr. Mornay has obliged us with an analysis of some of the singular Copper Ore sent up from Round Island in Capt. Williams' second despatch, which though it may be now read, should, I submit, in justice to that gentleman, have a separate place in the Journal, for it is certainly a very curious one, and a natural amalgam little to be looked for. The presence of the Mercury in the Ore would allow us to hope, that when better acquainted with this most interesting spot, that valuable mineral may be found thereabouts. Mr. Mornay finds it to be an alloy of Copper, Titanium, Mercury, Lead, Cobalt, and Iron, in different proportions, the different pieces varying in their composition.

Messrs. Weaver and Co. have been good enough to send us two fine specimens of petrified palms from Upper India, the exact locality they have not yet been able to ascertain for us.

We have received the following letter from Dr. Tamnaw, of Berlin, reiterating the offers of exchange of Minerals made by him in 1841.

*To Messrs. the Directors of the Bengal Asiatic Society, Calcutta.**

Berlin, Prussia, July 20, 1843.

GENTLEMEN,—A long while before I had the honour to receive your kind and esteemed letter, dated February 3, 1841, and I saw with great pleasure, that you do not refuse my proposal for an exchange in Minerals and Fossils from Europe, and particularly from Germany, for such mineralogical productions from the East Indies. However, Gentlemen, you did not wish, that I may forward to you a first invoice, as like as I did offer, because this part of your collections at the time were not so ordered for deciding what you may wish to receive, or what you may be in a state to give. You promised at the same time to make an invoice to me in fine and well cristallized Minerals from Hindostan, for which I should return such of Europe.

I take the confidence, Gentlemen, to refer myself to your remembrance, and so repeat the offer, which I made in my first letter. I should be exceedingly anxious to enter with you in such a relation of exchange; the science of Mineralogy may never be studied without collections so large as possible, and particularly in a country so large and so very unknown than yours it must be advantageous for the science, if the common sense for it may be awaked by an augmentation of the public collections by the productions of foreign countries. I repeat my offer to make to you a first invoice in the manner and in the way, as I said it in my first letter, and I request you to

* This letter is printed *verbatim*, being a record of proceedings.



inform me so soon as possible, if your arrangement of collections may be so much proceeded, that it should be desirable to you to receive any things from Europe in the way of exchange.

At the same time I take the confidence to include here some letters and little addresses, expressing my wishes of exchanging Minerals. In the interests of the science I beg you, Gentlemen, not only to communicate those letters and addresses to such of your honourable members or other scientific Gentlemen, friends to Mineralogy, who you may think able and willing to enter in such a relation of exchange with me,—but also to give their consent such a publication as possible in the scientific world of your country. I should be exceedingly indebted to you for every one communication, which could bring me to the desired relation of exchange, and I believe it advantageous to both parties, and to the science in general.

I expect your honourable reply, and I have the honour to remain with the greatest consideration and respect,

Gentlemen,

Your most obedient servant,

DR. FR. TAMMAN, Jun.

Address to Fr. Tamman, jun., Berlin, Prussia, care Mr. H. Pontoppidan, Hamburg.

CIRCULAR.

Berlin, Prussia, July 17, 1843.

SIR,—In possession of one of the greatest and most beautiful collections of Minerals we have on the Continent, I take the confidence to propose to you an exchange of fine and well cristallized Minerals and Petrifications from Germany, Sweden, Norway, &c. &c. for such Mineral productions of your country. The conditions which I propose, are the most simple in the world. I make you the first invoice, and after its arrival, you return me in British Minerals, what you may think an equitable and just equivalent. The expences for the transport must pay, who receives the box.

Being a scholar of celebrated Mr. Mohs, I occupy myself particularly with Cristallography, and *cristallized* specimens are, following, particularly desirable and interesting to me. I collect not petrifacts, and occupy myself less with Geology than with Mineralogy; following I prefer to receive minerals and cristals, also for the sent petrifacts, supposed that you may not have in the last rare and here unknown things. In relation of exchange with a great number of friends of the science I consent to receive a number of specimens of the same sort, which perhaps you may have abundantly, supposed that the sort may be interesting, and the specimens fine.

On the other side, I give you of the things which I can offer in this moment a Catalogue, and also a list of those specimens of your country, which I desire particularly. Remark, that those, which are underlined, are the most desirable. Have you, Sir, some scientific friends, who you may think able and willing to enter in such an exchange with me, then, Sir, I should be highly indebted to you for the communication of their addresses to me, and of the mine, which you find on the end of those lines, to them.

I expect, Sir, your honourable reply, and I have the honour to remain, Sir,

Your most obedient servant,

DR. FR. TAMMAN, Jun.

Catalogue of those Minerals, which I can offer in this moment.

A. From Sweden.—Blue Spinell xx, Chondrodite, Petalite, Spodumene, Lepidolite, Indicolite, Pyrrholite (new), Amphodelite (new), Glance Kobalt xx, Dichroite, Cerite, Cerine, Gadolinite, Yttro-Tantalite, Orthite, Pyrorthite, White massive Topaz, Pyrophysalite xx, Massive Emerald, Albite, Yttro Cerite, Fluo-Yttro-Cerite, Laumonite, Fahlunite, Automolite xx, Yellow Triklasite, Epidote, Asbestos, Red Silicate of Manganese, White Scapolite, Sphene xx, Tourmaline xx.

B. From Norway.—Zircon xx, Polymignite xx, Pyrochlor xx, Labrador spar, Elaeolite (green and red), Apatite, Tourmaline xx, Ilmenite xx, Noble Serpentine, Anthophyllite, Massive Apatite, Rutil xx, Foliated Titanic Iron Ore, Talcite, Pyrope, Titanic Iron Ore, Telluric Bismuth glance, Rose Quartz, Garnet xx, Skapolith xx, Epidote xx, Oligoklase xx, Felspar xx, Stilbite xx, Kolophomite, Blue Apatite, Fluor Spar xx.

C. From Bohemia.—Sphene xx in Klinkstone, Augite xx, Amphibole xx in Iron Clay Arragonite xx, Analcime xx, Chabasite xx, Natrolite xx, Apophyllite xx, Ryakolithe xx, Hyalite, Pyrope, Miemite xx, Bitter spar xx, Opal jasper, Porcelain jasper, Tungstate of Lime, Molybdena, Pitch Opal, Peastone, Wavellite, Egeran xx, Apatite xx, Fluor Spar xx, Quartz xx, Heavy Spar xx, Carbonate of Iron xx, Felspar xx, Comptonite xx.

C. a. From the Harz. Thuringia and Saxony.—Celestine fibrous xxx. Felspar in Pseudomorphous xx, Braunite xx, Hausmannite xx, Manganite xx, Pyrolusite xx, Harmotome xx, Apophyllite xx, Stilbite xx, Calcareous Spar xx, Fluor Spar xx, Tourmaline xx, Bournonite xx, Grey Antimonial Ore xx, Carbonate of Iron xx, Uranite xx, Andalusite xx, &c. &c.

D. From Bavaria.—Anatase xx, Chiasotolith xx, Felspar xx, Tourmaline xx, Arseniate of Iron xx, Carbonate of Iron xx, Sulphuret of Nickel, Zronsit, (Breithaupt new), Garnet xx, Zoisie, Rose Quartz, Triphylin, Triplite, Vivianite xx, Dichroit, Beril xx, Sphene xx, Grey Antimony, Magnetic Iron Pyrites.

E. From other countries.—Yellow amber from the Baltic, Olivine xx, Manganese Ores, etc. from Saxony. A number of things from Tyrol, the Hartz, Salzburg, and other parts of Germany. A few specimens from Iceland, the Faroe Islands, Finland, Hungary, Italy, &c. A great quantity of interesting things from North America, etc. etc.

F. A number of fine and interesting Petrefacts from Germany, particularly from Bohemia, Bavaria, etc. etc. Sweeden, Norway, etc. etc.

List of such British Minerals, which I wish particularly to receive.

1. From England and Wales.—Hatchettine, Bournonite xx, Haytorite xx, Brookite xx, Oxyde of Tin xx, Vivianite xx, Cube Ore xx, Axinite xx, Pinite xx, Sulphuret of Copper xx, Arseniate of Copper xx, Phosphate of Copper xx, Tourmaline xx, Sulphate of Lead xx, Cupreous Sulphate of Lead xx, Arseniate of Lead xx, Arsenio Phosphate of Lead xx, Chlorate of Lead xx (from Mendip), Arsenio Sulphate of Lead xx, Ruby Copper xx, Apatite xx, Topaz xx from Cornwall, Fluor Spar xx in its diverse forms, Heavy Spar xx, particularly the great crystals from Alstone Moor and Durham, Carbonate of Barytes xx, Bi-Calcareo Carbonate of Barytes xx, Baryto Chalcite xx, Sulphate Carbonate of Barytes xx, Tungstate of Lime xx, Tungstate of Iron xx, Hydrous Oxide of Iron xx, Carbonate of Iron xx, Anatase xx, Uranite xx, Felspar xx, Murchi-



sonite xx, Blende xx, Sulphuret of Tin xx, Tennantite xx, Sulphuret of Copper xx, Copper Pyrites xx, Fluellin xx, Childrenite xx, Wavellite.

2. *From Scotland.*—Greenockite xx, Prehnite xx, Felspar xx, Chabasite xx, Stilbite xx, Withamite xx, Harmotome xx, Brewsterite xx, Edingtonite xx, Laumonite xx, Strontianite xx, Mesotype xx, Sulphato Carbonate of Lead xx, Sulphato Tri-Carbonate of Lead xx, Carbonate of Lead xx, Cupreous Sulphate of Lead xx, Cupreous Sulphato Carbonate of Lead xx, Topaz xx from Mar and Cairngorm, Hydrate of Magnesia from Swinness, Thomsonite xx, Stellite, Apophyllite xx from Fifeshire, Red Hewlandite.

3. *From Ireland.*—Felspar xx from Newry, Topaz xx, Beril xx, Antrimolite, Levyne, Gmelinite, Chabasite xx, Apophyllite xx, Natrolite, Harringtonite, Analcime xx, Erinite xx.

4.—Minerals from the East Indies, New Holland, the Cape of Good Hope, Brasil, Peru, Chili, Mexico, Spain, and Portugal.

5. *From Hindostan.*—Apophyllite and Poohnahlite xx from Poonah, Mesotype xx, Stilbite xx, Zircon xx, Diamond xx, Corundum xx, (Sapphir xx), Ceylonite xx, (Spinnell xx), Red Tourmaline xx, etc. etc.

Address: Dr. Fr. Tamman, Jun. Berlin, Prussia, care of Mr. Ed. Nicol, Stettin, or Mr. H. Pontoppidan, Hamburgh, or Messrs. F. Behm and Co. Dantzig.

In reply to it I may say that we shall soon, I trust, be in a position to say what we can spare, but that we have first heavy debts to pay off, for which the very few duplicates of rare and Indian minerals we possess will certainly not be too many. And with reference to this matter I may repeat here what I had occasion to remark, touching both geological and mineralogical specimens in India, in a former report namely; that we unfortunately receive, for the most part, but single geological series, or specimens of minerals, and then that twenty years may elapse before we obtain another; so that while in Europe no sooner is a mineral or geological locality known as producing something of value to collectors, than it is ransacked, and in fact made a mine of, till the supply equals the demand, or as is sometimes the case, till the mineral is exhausted; in India we obtain a notice and specimens, or a series or two, and then even at our very doors, no more are to be obtained till another geologist or mineralogist visits the spot. I quoted there the case of Captain Franklin's specimens from the Diamond mines of Punnah; I may add in explanation of the words "our very doors" used above, and as a striking instance of what I wish here to explain, that I have now been for the last two years endeavouring to obtain a supply of the vegetable impressions from the coal shales of our Burdwan coal mines, and that I have not yet succeeded! We have a very beautiful collection of them presented by Dr. Royle ten or fifteen years ago, but none to spare; and yet these things are but the rubbish of the mines!—and within fifty miles of Calcutta!

Museum of Economic Geology.—I have here the pleasure to announce the discovery of an Indian Lithographic Stone, almost equal to the German. It is another of the specimens sent down by Capt. Shortrede from near Rewah, as noticed at the last meeting and Mr. Black's letter relative to it is as follows:—

To H. PIDDINGTON, Esq. Sub-Secretary to the Asiatic Society, Calcutta.

SIR,—I have pleasure in sending a few impressions taken off the two little stones you first sent me; those from the larger piece have come off well, and I think if a slab of



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the size of 8 or 10 inches, or a little larger, could be obtained, I could give a favourable report of it. From what I have been able to ascertain, I think this quality will answer remarkably well, and as far as my experience enables me to judge, being 20 years practically engaged in Lithographic Printing, I can safely say I have not met with any Indian stone approach so near to the German, which is the best we now have.

Of the smaller piece I cannot form an opinion, being too small to admit of a fair trial, but it takes a good polish, and may answer pretty well for Lithographing written forms upon, if not too soft; the black marks upon it would be an objection to its being used for taking off drawings.

I have not been able to try the other specimens yet, but will report upon them as soon as I am able to do so.

As requested, I have pleasure in sending the accompanying three pieces of Europe Stones, of such as I use in my establishment, and remain,

Sir, your obedient faithful servant,

Asiatic Lithographic Press, 3, Hare Street,

THOS. BLACK.

13th November 1843.

This is certainly most satisfactory, and I have written to Capt. Shortrede to obtain a larger piece as desired, as also to know if his public duties will admit of his shortly visiting the spot with sufficient leisure to examine the quarry or quarries from whence the heap of stones, amongst which this fine specimen was found, was taken; or if it may be necessary either for him or for the Society to address Government on the subject, which I venture respectfully to submit it might with great propriety do. The probable direct saving to Government in its own lithographic establishments at the three presidencies, though a large item, is a mere trifle when compared with the immense benefit to the native literary community, to whom the high price of lithographic stones is almost a prohibition upon many enterprises of great utility; the price of good German stones varying in Calcutta, from six annas to twelve annas a pound weight. A stone large enough for an octavo page, costing thus from 25 to 40 Rupees: Large ones for maps from 80 to 120 Rs. or more. If the quarry should afford a good supply, and water carriage down the Tonse be available, it is quite possible these stones may become an article of export at least to various parts of India, if not to Europe.

Mr. Black has farther obliged us with a set of specimens of the various kinds of stones used in his establishment, for the Museum. Capt. Lyrand Jacobs of the Bombay Army, has sent us a valuable printed memoir on the Iron of Kattywar, and modes of smelting the ores, and obligingly offers to procure for us a set of specimens, which will be most acceptable; and I take this opportunity of mentioning, that any thing of the nature of papers, whether written or printed, old or new, relative to any inorganic product of the earth or the processes whereby it is fitted for the service of man, will find a place in our Museum, or its records.

H. PIDDINGTON.



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